

PARMOTREMA

Parmotrema Massal.

The Scatter-rug Lichens

Medium stratified foliose lichens, corticate above and below, sorediate or isidiate or not, sparsely **ciliate** (ours), lobes **loosely attached to partly semi-erect**, short to somewhat elongate, averaging to 5–10 mm wide, thin. Upper surface **whitish to pale greyish**, smooth. Lower surface blackening, shiny, bearing numerous simple rhizines, but **marginal area lacking rhizines**. Medulla white. Photobiont green.

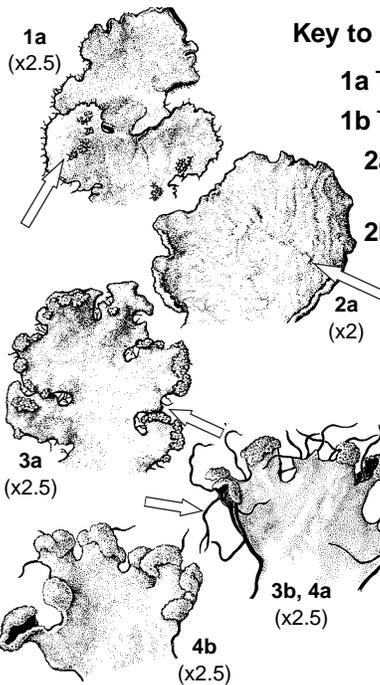
Apothecia unknown in B.C. material.

Over trees, rarely over rock.

References: Hale (1965b, 1974).

Common Name: Alludes to the broad lobes and ciliate margins characteristic of the species.

Notes: *Parmotrema* is primarily a temperate and tropical genus consisting of approximately 100 species (excluding *Rimelia* Hale and Fletcher). Thirty-six of these occur in North America and only three in B.C. *Parmotrema* was formerly treated as a subgenus within *Parmelia*.



Key to *Parmotrema* and Similar Lichens

- 1a Thallus isidiate(←), isidia frequently bearing black cilia ***Parmotrema crinitum***
- 1b Thallus sorediate; cilia restricted to lobe margins 2
- 2a Upper surface bearing tiny white pseudocyphellae(←); lobe margins lacking cilia
..... ***Cetrelia cetrarioides***
- 2b Upper surface lacking pseudocyphellae; lobe margins ciliate or not 3
- 3a Soralia broad, diffuse, loosely packed with soredia; cilia very sparse, less than 1 mm long(←); rhizines progressively better developed toward thallus centre; medulla C+ rose ***Hypotrachyna revoluta***
- 3b Soralia narrow to more often head-shaped, sharply delimited, densely packed with soredia; cilia usually more than 2 mm long(←); rhizines often abruptly longer toward thallus centre; medulla C- 4
- 4a Cilia more or less evenly distributed, usually averaging to more than 3 mm long; soredia often brownish when mature; medulla K-, KC+ reddish
..... ***Parmotrema arnoldii***
- 4b Cilia unevenly distributed, usually less than 2 mm long; soredia usually pale when mature; medulla K+ yellow, KC- ***Parmotrema chinense***

***Parmotrema arnoldii* (Du Rietz) Hale**

(Syn. *Parmelia arnoldii* Du Rietz)

Powdered scatter-rug

Habitat/Range: Frequent over trees and shrubs in open coastal forests at lower elevations, especially in hypermaritime localities; western N Am – eastern N Am – western Eurasia, N to AK, S to MX.

Reactions: Cortex K+ yellow; medulla KC+ reddish.

Contents: Alectoronic and atranorin acid (and rhodophyscin).

***Parmotrema chinense* (Osbeck) Hale & Ahti**

Map 74

(Syn. *Parmelia perlata* Ach. [nom. illeg.]; *Parmotrema perlatum* Hale [nom. illeg.]; *Parmelia coniocarpa* Laurer)

Powdered scatter-rug (broad shield)

Habitat/Range: Rare over trees and shrubs in open hypermaritime forests at lower elevations; incompletely circumpolar, N to BC, S to MX.

Reactions: Cortex K+ yellow; medulla K+ yellow, PD+ orangish.

Contents: Atranorin and stictic acid.

Parmotrema crinitum (Ach.) Hale

(Syn. *Parmelia crinita* Ach.)

Salted scatter-rug (granulated shield)

Habitat/Range: Infrequent over trees and shrubs in open hypermaritime forests at lower elevations, also rare over oceanside rock; incompletely circumpolar, N to BC, S to MX.

Reactions: Cortex K+ yellow; medulla K+ yellow, PD+ orangish.

Contents: Atranorin and stictic acid.

PELTIGERA

Peltigera Massal.

The Pelt Lichens

Small to **large stratified foliose lichens**, corticate above, **noncorticate below**, isidiate, sorediate or lobulate or not, cephalodiate or not, lobes **loosely attached**, short to subrotund, averaging to 1–3 (–4) cm wide, thin or thick. Upper surface greenish, greyish or brownish, smooth or somewhat roughened, naked or tomentose. Lower surface pale or dark, usually **veined**, bearing numerous rhizines, these short or long, slender or tufted. Medulla white.

Photobiont green and/or blue-green.

Apothecia appressed on upper surface near margins, often **saddle-shaped**, disc brownish; spores 4-celled to multi-celled, ellipsoid or needlelike/acicular, colourless or brown at maturity, (2–) 8 per ascus.

Over soil and moss, occasionally over trees.

References: Brodo and Richardson (1978); Tønsberg and Holtan-Hartwig (1983); Vitikainen (1985); Holtan-Hartwig (1988, 1993); Goffinet (1992); Goward et al. (1994b).

Common Name: Echoes the genus name and describes the general resemblance of the species to various animal skins.

Notes: All but one of the 30 *Peltigera* species reported for North America are known to occur in B.C. *Peltigera* is a taxonomically rather difficult genus containing a number of species groups that are not yet satisfactorily elucidated. Chemistry is highly variable in this group; though thin-layer chromatography may help to identify some species, spot test reactions do not.

Key to *Peltigera* and Similar Lichens

1a Photobiont a lime-green to grass-green alga; upper surface generally greenish, especially when wet (Note: check sheltered lobes); wart-like cephalodia sometimes present over upper or lower surface 2

2a Cephalodia present over upper surface(←) 3

3a Lower surface darkening abruptly inward of lobe tips(←); undersides of apothecia green-corticate throughout; veins generally either indistinct or absent 4

3b Lower surface darkening only gradually inward of lobe tips(←), and/or undersides of apothecia patchy-corticate, noncorticate areas appearing whitish; veins sometimes well developed 5

4a Mature cephalodia peltate(←) (i.e., slightly raised and free at margins: check sheltered lobes), usually flat or concave, frequently detached when mature, leaving white scars, occasionally enlarging into distinct bluish lobes; humid localities at lower elevations ***Peltigera britannica***

4b Mature cephalodia closely appressed throughout(←), not at all peltate, never detaching or enlarging; widespread ***Peltigera aphthosa***

5a Undersides of apothecia green-corticate throughout(←); lobes rather few; lobe margins even or weakly crisped; restricted to snowy districts, usually at higher elevations ***Peltigera* sp. 1**

5b Undersides of apothecia patchy-corticate(←); many lobes; lobe margins often strongly crisped; widespread ***Peltigera leucophlebia***

2a, 4b (x.5)

3a, 4b (x.5) lower

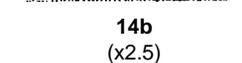
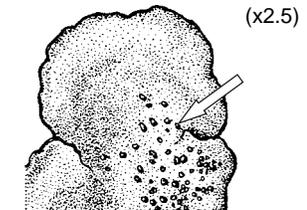
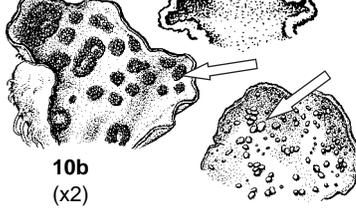
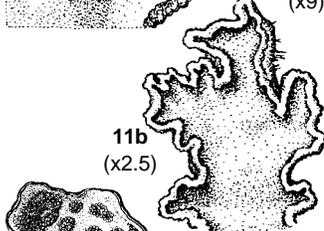
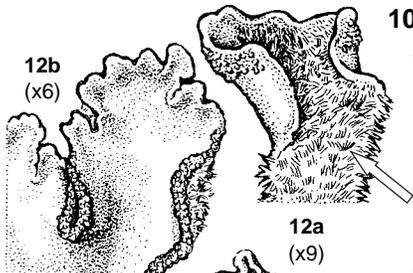
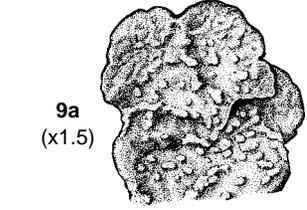
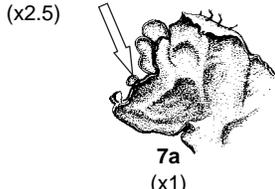
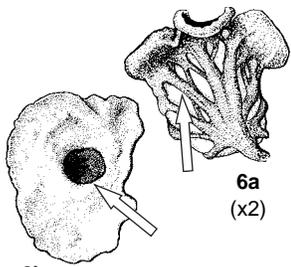
4a (x11) cephalodia

4b (x11) cephalodia

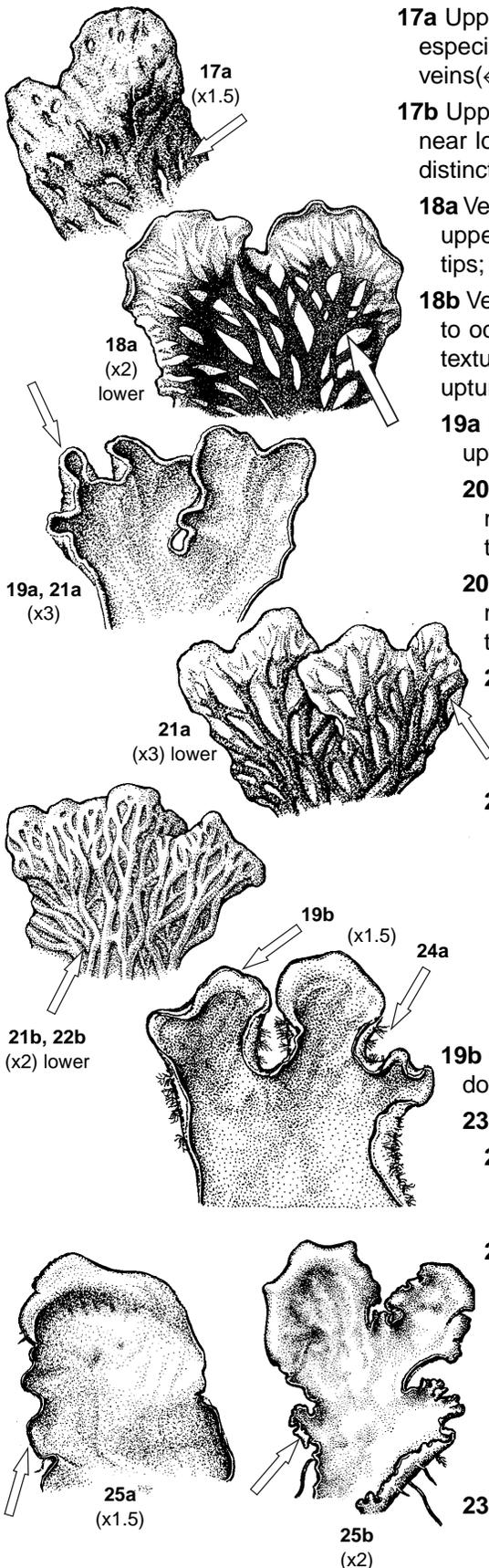
3b, 5b (x.5) lower

5a (x1.5) apothecium

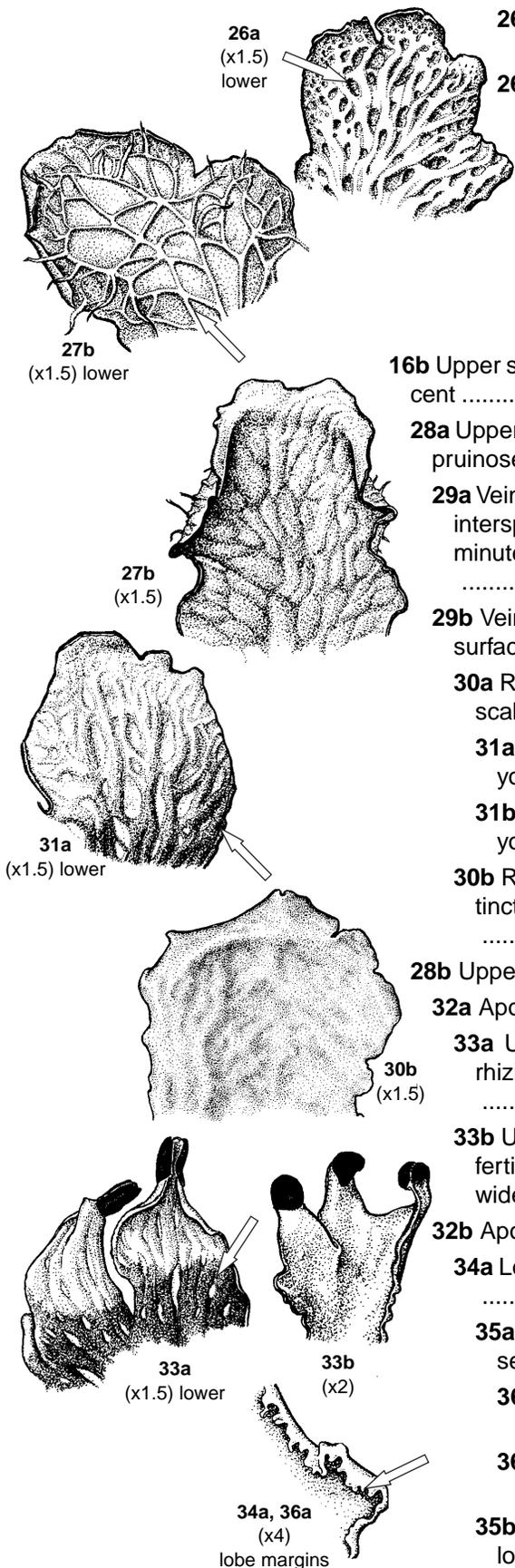
5b (x1.5) apothecium



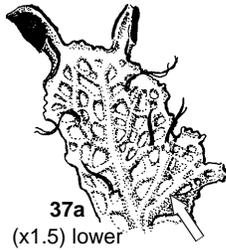
- 2b Cephalodia absent over upper surface; upper surface smooth 6
- 6a Thallus attached to substrate at single point along margin; veins darkening, generally highly contrastive with pale interspaces(←); apothecia present, situated near lobe margins, never sunken **Peltigera venosa**
- 6b Thallus broadly and more or less centrally attached to substrate; veins indistinct or at most only moderately contrastive with interspaces; apothecia present or absent, situated near thallus centre, usually somewhat sunken(←) **Solorina**
- 1b Photobiont a greyish blue to dark blue cyanobacterium; upper surface generally greyish to bluish or brownish, never bright green when wet; cephalodia absent (Note: all species bearing soredia, isidia or marginal lobules key here) 7
- 7a Growing attached to *P. aphthosa* aggregate (i.e., including *P. britannica* and *P. leucophlebia*); upper surface bluish grey (turning brownish in herbarium), bearing scattered greenish lobules(←), these minutely hairy; restricted to humid sites in humid regions (blue-green phototypes of) **Peltigera aphthosa, P. britannica, P. leucophlebia**
- 7b Not attached to *Peltigera aphthosa* aggregate. 8
- 8a Soredia present over lobe margins or upper or lower surface 9
- 9a Rhizines absent; veins densely covered in minute erect hairs; upper surface K+ yellow or K- **Lobaria**
- 9b Rhizines present; veins cottony, but not covered in minute erect hairs; upper surface K- 10
- 10a Soredia essentially confined to lobe margins 11
- 11a Lower surface usually lacking veins; upper surface sometimes bearing minute erect hairs; over trees in hypermaritime localities; rare 12
- 12a Upper surface partly covered in dense, minute, stiffly erect hairs(←); medulla PD+ orange **Erioderma sorediatum**
- 12b Upper surface partly covered in sparse appressed woollen hairs/tomentum; medulla PD- **Leioderma sorediatum**
- 11b Lower surface more or less distinctly veined; upper surface lacking hairs; over various substrates; widespread; infrequent **Peltigera collina**
- 10b Soredia essentially confined to upper surface(←) **Peltigera didactyla**
- 8b Soredia absent 13
- 13a Isidia and/or regeneration lobules well developed over upper surface; inland 14
- 14a Isidia scalelike/dorsiventral, more or less appressed(←); lobes averaging to less than 0.8 cm wide at maturity; lobe tips conspicuously upturned; usually over soil; infrequent **Peltigera lepidophora**
- 14b Isidia short-cylindrical(←) or rarely scalelike/dorsiventral, but always erect; lobes averaging to 1 cm or more wide at maturity; lobe tips often downturned; over moss in sheltered sites; rare **Peltigera evansiana**
- 13b Isidia and lobules absent or lobules occasionally present along stress cracks and/or lobe margins 15
- 15a Upper surface bearing scattered greenish lobules (= *P. aphthosa* aggregate), these minutely hairy and containing green algae; restricted to humid regions (blue-green phototype of) **Peltigera aphthosa, P. britannica, P. leucophlebia** (see lead 7a)
- 15b Greenish lobules absent; distribution various 16
- 16a Upper surface minutely woolly/pubescent, hairs closely appressed or erect and feltlike (Note: In *P. malacea* and *P. kristinssonii*, hairs are often confined to immediate vicinity of lobe tips and may be difficult to observe) 17



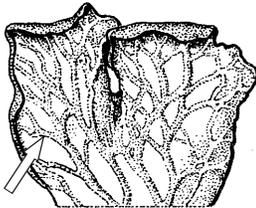
- 17a** Upper surface dark greenish when wet, bearing minute, erect, feltlike hairs, especially near lobe tips; lower surface lacking veins or with few and very broad veins(←); medulla thick *Peltigera malacea*
- 17b** Upper surface bluish or greyish when wet, bearing appressed or erect hairs near lobe tips; lower surface more or less veined; medulla thin or at least not distinctly thick 18
- 18a** Veins low, very dark brown at maturity, highly contrastive with interspaces(←); upper surface partly textured/scabrid, bearing minute erect hairs near lobe tips; lobe tips mostly downturned *Peltigera kristinssonii*
- 18b** Veins more or less raised, pale or dark at maturity, moderately contrastive to occasionally highly contrastive with the interspaces; upper surface rarely textured, generally covered in appressed tomentum near lobe tips; lobe tips upturned or downturned 19
- 19a** Lobes averaging to less than 1.5 cm wide at maturity; lobe tips mostly upturned(←) 20
- 20a** Apothecia averaging to 3–5 (–6) mm long at maturity; thallus consisting mostly of fertile lobes; sterile lobes, when present, frequently bearing distinct orbicular “scars” over upper surface *Peltigera didactyla*
- 20b** Apothecia averaging to 4–8 (12) mm long (smaller in depauperate specimens); thallus consisting of at least some sterile lobes, occasionally entirely sterile; upper surface lacking scars 21
- 21a** Rhizines partly growing together/confluent and mat-forming; veins appearing soft, rather feltlike (←), uniformly (and often abruptly) darkening inward of lobe tips, mostly forming netlike pattern *Peltigera rufescens*
- 21b** Rhizines mostly discrete; veins appearing hard, compact(←), pale throughout or more often irregularly darkening, often apparently overlapping 22
- 22a** Lobe margins and/or stress cracks usually bearing “regeneration” lobules (check mature lobes); upper surface often somewhat broadly blistered/pustulate *Peltigera praetextata* (see lead 25b)
- 22b** Lobules absent; upper surface even or at least not pustulate *Peltigera ponojensis*
- 19b** Lobes averaging to more than 1.5 cm wide at maturity; lobe tips mostly downturned(←) 23
- 23a** Veins lacking erect hairs 24
- 24a** Rhizines somewhat tufted(←) and/or growing together/confluent and mat-forming, especially toward thallus centre; upper surface often (but not always) tomentose throughout *Peltigera canina*
- 24b** Rhizines generally slender and discrete; upper surface usually (but not always) abruptly hairless inward of lobe tips 25
- 25a** Veins distinctly rusty cinnamon toward thallus centre; lobe margins more or less even(←); lobules absent *Peltigera cinnamomea*
- 25b** Veins pale or darkening to brown, but apparently never distinctly cinnamon; lobe margins more or less wavy/cripsed(←), often bearing tiny “regeneration” lobules, these sometimes also present along stress cracks (check mature lobes) *Peltigera praetextata*
- 23b** Veins densely and usually conspicuously covered in minute, erect hairs 26



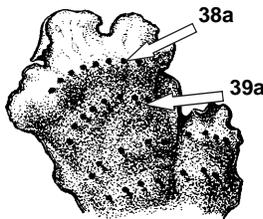
- 26a** Veins broad, raised, overlapping; interspaces deeply pitted, mostly oval in outline(←); rhizines thickish; boreal *Peltigera retifoveata*
- 26b** Veins narrow, raised or not, generally netlike; interspaces not deeply pitted, polygonal to more often lens-shaped/lenticular; rhizines slender; distribution various 27
- 27a** Lobules usually developed along margins and/or stress cracks (check mature lobes); interspaces mostly lens-shaped/lenticular; veins raised or more often rather low
..... *Peltigera praetextata* (see lead 25b)
- 27b** Lobules absent; interspaces lens-shaped/lenticular to polygonal(←); veins distinctly raised *Peltigera membranacea*
- 16b** Upper surface occasionally textured or white-pruinose, but never woolly/pubescent 28
- 28a** Upper surface in part conspicuously textured/scabrid, apparently never white-pruinose 29
- 29a** Veins very dark toward thallus centre, strikingly and sharply contrastive with interspaces; upper surface apparently hairless/glabrous, but actually bearing minute erect hairs near lobe tips (check sheltered lobes)
..... *Peltigera kristinssonii* (see lead 18a)
- 29b** Veins dark or pale, not at all strikingly contrastive with interspaces; upper surface hairless/glabrous 30
- 30a** Rhizines short and stout; upper surface uniformly and distinctly textured/scabrid; inland 31
- 31a** Lower surface dark toward thallus centre(←); rhizines dark, even when young *Peltigera scabrosa*
- 31b** Lower surface pale toward thallus centre; rhizines pale at least when young (check lobe tips) [*Peltigera scabrosella*] (see *P. scabrosa*)
- 30b** Rhizines elongate and slender; upper surface irregularly and often indistinctly textured/scabrid; widespread in humid localities
..... *Peltigera neopolydactyla*
- 28b** Upper surface smooth or at most white-pruinose (check lobe tips) 32
- 32a** Apothecia distinctly black 33
- 33a** Upper surface distinctly shiny; veins usually indistinct(←); outermost rhizines typically dark; generally over mossy ground; inland
..... *Peltigera neckeri*
- 33b** Upper surface usually rather dull; veins rather narrow and distinct (check fertile lobes); outermost rhizines typically pale; often over (mossy) trees; widespread in humid localities *Peltigera collina*
- 32b** Apothecia brownish or apothecia absent 34
- 34a** Lobe margins and/or margins of stress cracks bearing distinct lobules(←) 35
- 35a** Veins low, often abruptly darkening inward of lobe tips; interspaces absent or at most sparse and oval 36
- 36a** Outermost rhizines generally aligned in concentric rows; inland
..... *Peltigera elisabethae* (see also lead 39a)
- 36b** Outermost rhizines unaligned; coastal
..... *Peltigera lactucifolia* (see lead 46a)
- 35b** Veins somewhat raised, darkening only gradually (if at all) inward of lobe tips; interspaces mostly numerous and lens-shaped/lenticular ... 37



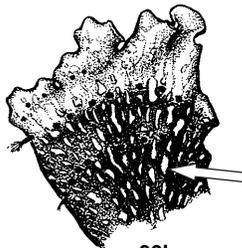
37a
(x1.5) lower



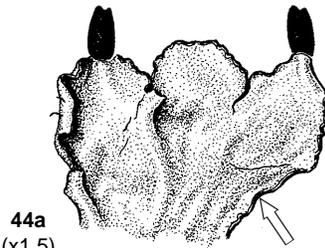
37b
(x1.5) lower



(x1.5) lower

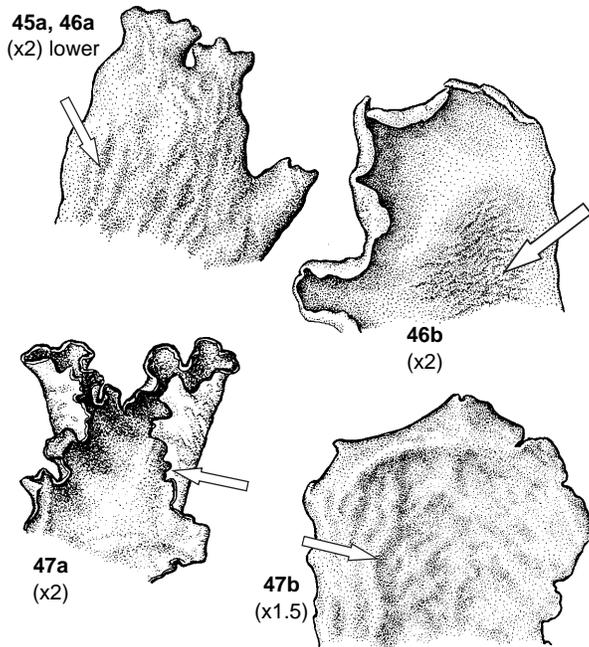


39b
(x1.5) lower



44a
(x1.5)

- 37a** Marginal lobules well developed; rhizines darkening abruptly inward of lobe tips; veins rather broad, thick(←) ***Peltigera pacifica***
- 37b** Marginal lobules poorly developed, indistinct; rhizines darkening only gradually inward of lobe tips; veins narrow-linear, rather thin(←)
..... ***Peltigera degenii***
- 34b** Lobe margins even to occasionally wavy/crisped, but never distinctly lobulate; margins of stress cracks not lobulate 38
- 38a** Outermost rhizines stout, generally aligned in concentric rows(←); apothecia, if present, horizontally oriented, disc more or less plane 39
- 39a** Upper surface generally bearing numerous stress cracks; veins indistinct or more often absent(←); interspaces, when present, sparse and circular
..... ***Peltigera elisabethae***
- 39b** Upper surface continuous or at least not bearing numerous stress cracks; veins present and distinct to occasionally rather indistinct; interspaces more or less numerous and oval to elongate(←)
..... ***Peltigera horizontalis***
- 38b** Outermost rhizines stout or slender, unaligned; apothecia, if present, vertically oriented and vertically folded at maturity 40
- 40a** Veins narrow and more or less distinctly raised (occasionally also “overlapping” in *P. ponojensis*); veins and rhizines covered or not in minute erect hairs 41
- 41a** Veins and rhizines partly covered in distinct minute erect hairs
..... (hairless/glabrous form of) ***Peltigera membranacea*** (see lead 27b)
- 41b** Veins and rhizines lacking minute erect hairs 42
- 42a** Upper surface dull; lobe tips upturned; veins often partly “overlapping”; restricted to dry sites; frequent in inland localities, infrequent in coastal localities
..... (hairless/glabrous form of) ***Peltigera ponojensis*** (see lead 22b)
- 42b** Upper surface distinctly shiny; lobe tips downturned; veins not at all “overlapping”; restricted to humid sites; rare both in coastal and inland localities ***Peltigera degenii*** (see lead 37b)
- 40b** Veins broad, low, never overlapping; veins and rhizines never erect-tomentose 43
- 43a** Veins very dark at maturity (check thallus centre), highly contrastive with interspaces; upper surface apparently hairless/glabrous, but actually bearing minute hairs near lobe tips (check sheltered lobes); inland
..... ***Peltigera kristinssonii*** (see lead 18a)
- 43b** Veins pale or dark, never highly contrastive with interspaces; upper surface hairless/glabrous throughout; distribution various 44
- 44a** Lobes distinctly thick; upper surface often partly white-pruinose (check lobe tips); stress cracks frequent(←); interspaces usually sparse; inland
..... ***Peltigera neckeri*** (see also lead 33a)
- 44b** Lobes thin or at least not distinctly thick; upper surface not at all white-pruinose; stress cracks uncommon; interspaces numerous or sparse; widespread in humid climates 45



- 45a** Rhizines short, stout, sparse, poorly developed; veins indistinct(←), interspaces sparse; restricted to open sites 46
- 46a** Upper surface smooth; outermost rhizines usually tapering to point, pale; maritime, mostly over sheltered mossy outcrops along coast ***Peltigera lactucifolia***
- 46b** Upper surface in part minutely wrinkled(←); outermost rhizines usually tufted, dark; primarily inland (absent along outer coast); usually in open sites, in bogs and at mossy edges of ponds and alpine tarns ***Peltigera occidentalis***
- 45b** Rhizines short to more often elongate, slender, abundant, well developed; veins usually (but not always) distinct; interspaces more or less numerous; usually restricted to sheltered sites 47
- 47a** Lobe margins tattered/lacerate or at least very strongly crisped(←); main lobes averaging to 5–10(–12) mm wide; upper surface plane or variously wrinkled, but never broadly blistered/pustulate ***Peltigera polydactylon***
- 47b** Lobe margins not lacerate or strongly crisped; lobes averaging to more than 12 mm wide; upper surface even or somewhat broadly blistered/pustulate(←)
 ***Peltigera neopolydactyla***

***Peltigera aphthosa* (L.) Willd.**

Freckle pelt (freckled lichen, studded leather lichen)

Habitat/Range: Common over soil, moss, duff, logs and rock in open to somewhat shady inland localities, also rare in maritime localities; circumpolar, S to CA and NM.

Contents: Both phototypes: gyrophoric acid, methyl gyrophorate, tenuiorin, (phlebic acid A and B), and various unknowns.

Notes: Like other members of the *P. aphthosa* group (i.e., including *P. britannica* and *P. leucophlebia*), *P. aphthosa* may occasionally give rise, through its cephalodia, to discrete blue-green thalli. Such thalli, first reported from Norway by Tønsberg and Holtan-Hartwig (1983), represent *P. aphthosa*'s blue-green phototype. Recently this phototype was detected in inland B.C. (Goward et al. 1994b) where, together with that of *P. leucophlebia*, it appears to be very rare. The blue-green phototype of *P. britannica* has also been reported from B.C. (Brodo and Richardson 1978), but seems not uncommon in humid lowland localities in the southern half of the province. All three phototypes have a bluish grey upper surface that is flecked with thin, white, angular markings/maculae. These taxa are most reliably distinguished from one another on the basis of the associated green thalli (i.e., whether *P. aphthosa*, *P. britannica* or *P. leucophlebia*). See also notes under *Peltigera* sp. 1.

***Peltigera britannica* (Gyelnik) Holtan-Hartwig & Tønsb.**

Freckle pelt

Habitat/Range: Common over moss and mossy logs and rocks in sheltered to somewhat shaded coastal localities at lower elevations, also infrequent in humid intermontane forests (ICH zone); western N Am – western Eurasia, S to OR.

Contents: Both phototypes: phlebic acid A, phlebic acid B, and various unknowns (Tønsberg and Holtan-Hartwig 1983).

Notes: Under humid conditions the cephalodia may grow out into distinct thalli. These represent *P. britannica*'s blue-green phototype. See notes under *P. aphthosa*.

***Peltigera canina* (L.) Willd.**

Dog pelt (ash-coloured ground liverwort, dog tooth lichen, dog lichen)

Habitat/Range: Common over soil, moss, duff or logs in open to somewhat sheltered sites throughout, except probably absent in hypermaritime regions; circumpolar.

Contents: No lichen substances reported.

Notes: The material included here is heterogeneous.

***Peltigera cinnamomea* Goward**

Dog pelt

Habitat/Range: Frequent over moss and mossy rocks and logs in open to somewhat sheltered inland forests, especially in ICH zone, occurring even in the snowiest districts; apparently western N Am, N to BC, S to OR.

Contents: No lichen substances detected.

***Peltigera collina* (Ach.) Schrader**

(Syn. *Peltigera scutata* (Dickson) Duby)

Tree pelt (dusty-margined dog lichen)

Habitat/Range: Infrequent over mossy rocks and conifers in sheltered forests at lower elevations in humid regions throughout; probably incompletely circumpolar, S to CA.

Contents: Tenuiorin and zeorin.

Notes: Some forms of *P. collina* could be mistaken for *Nephroma parile*. In that species, however, the lower surface lacks veins and rhizines.

***Peltigera degenii* Gyelnik**

Frog pelt

Habitat/Range: Infrequent over moss and mossy logs in open to somewhat sheltered forest sites at lower elevations, mostly restricted to humid regions; probably incompletely circumpolar, S to OR.

Contents: No lichen substances reported.

***Peltigera didactyla* (With.) Laundon**

(Syn. *Peltigera spuria* (Ach.) DC.)

Temporary pelt

Habitat/Range: Frequent over soil and moss in open sites throughout, except rare in coastal regions and probably absent from hypermaritime localities; circumpolar, S to CA.

Contents: Var. *didactyla*: lichen substances absent or a few unidentified substances occasionally present in trace amounts. Var. *extenuata*: methyl gyrophorate and gyrophoric acid.

Notes: Two varieties occur in B.C.:

1a Rhizines white-woolly in central portions of thallus, but sparse and simple toward margins; mature lobes often deeply concave, typically consisting of single lobe (but occasionally many-lobed), averaging to less than 1 cm wide; medulla KC-; widespread var. ***didactyla***

1b Rhizines white-woolly throughout or sometimes disappearing toward thallus centre; mature thallus typically flat to at most weakly concave, more or less lobate, averaging to more than 1 cm wide; medulla KC+ reddish (flash) or KC-; inland var. ***extenuata* (Nyl.) Goffinet & Hastings**

***Peltigera elisabethae* Gyelnik**

Concentric pelt

Habitat/Range: Frequent over soil and mossy (base-rich) rock in open inland forests; probably circumpolar, S to OR.

Contents: Tenuiorin and zeorin.

***Peltigera evansiana* Gyelnik**

Map 76

Peppered pelt

Habitat/Range: Rare over mosses in sheltered forests, especially in boreal regions; N Am, primarily an eastern species.

Contents: No lichen substances detected.

***Peltigera horizontalis* (Huds.) Baumg.**

Concentric pelt (flat dog lichen)

Habitat/Range: Frequent over moss and mossy rocks and logs in open or somewhat sheltered intermontane forests at lower elevations; probably incompletely circumpolar, S to OR.

Contents: Tenuiorin and various unknown substances.

***Peltigera kristinssonii* Vitik.**

(Syn. *Peltigera occidentalis sensu* Krist.)

Dog pelt

Habitat/Range: Infrequent over soil and moss in sheltered boreal and especially intermontane forests, usually at lower elevations; apparently western N Am – western Eurasia, S to CO.

Contents: No constant lichen substances reported (Vitikainen 1985).

***Peltigera lactucifolia* (With.) Laundon**

(Syn. *Peltigera hymenina* (Ach.) Delise ex Duby)

Frog pelt

Habitat/Range: Rare (overlooked?) over sheltered, mossy, seaside outcrops in hypermaritime localities; possibly western N Am–eastern N Am–western Eurasia, S to BC.

Contents: Dolichorrhizin, methyl gyrophorate, peltidactylin, tenuiorin, and zeorin.

Notes: The report is tentative. The B.C. material differs from the usual circumscription of *P. lactucifolia* in having a distinctly dark lower surface, especially toward the thallus centre. This material might more appropriately be referred to *P. occidentalis*, although that species (as currently defined) has a primarily inland distribution.

***Peltigera lepidophora* (Nyl. ex Vainio) Bitter**

Butterfly pelt

Habitat/Range: Infrequent over soil and moss in open sites throughout, except apparently rare in coastal regions; circumpolar, S to CO.

Contents: (Tenuiorin.)

***Peltigera leucophlebia* (Nyl.) Gyelnik**

Freckle pelt

Habitat/Range: Frequent over soil, moss and mossy rocks and logs in open forested sites throughout; circumpolar, S to CA.

Contents: Various unknown substances (Tønsberg and Holtan-Hartwig 1983).

Notes: In humid intermontane regions, the cephalodia in *P. leucophlebia* may enlarge (very rarely) into separate blue-green lobes. These represent the blue-green photobiont of this species. See notes under *P. aphthosa*.

***Peltigera malacea* (Ach.) Funck**

Apple pelt (even dog lichen)

Habitat/Range: Frequent over soil and moss in open, usually dry inland forests and alpine ridges; circumpolar, S to CO.

Contents: (Tenuiorin, zeorin and various unidentified substances [Holtan-Hartwig 1988].)

***Peltigera membranacea* (Ach.) Nyl.**

Dog pelt

Habitat/Range: Frequent over soil, moss, and mossy rocks and logs in humid localities throughout, except essentially absent from boreal regions; incompletely circumpolar, S to CA.

Contents: No lichen substances reported.

***Peltigera neckeri* Hepp ex Müll. Arg.**

Frog pelt

Habitat/Range: Infrequent over soil, mossy rocks and decaying logs in forested inland localities, especially in ICH zone, rare also in steppe communities; probably circumpolar, S to OR.

Contents: Dolichorrhizin, zeorin and various unidentified substances (Holtan-Hartwig 1988).

***Peltigera neopolydactyla* (Gyelnik) Gyelnik**

(Syn. *Peltigera occidentalis* (E. Dahl) Krist.)

Frog pelt

Habitat/Range: Frequent over soil, moss, mossy rocks and logs in humid localities throughout, except apparently absent from boreal regions; probably incompletely circumpolar, S to CA.

Contents: Tenuiorin.

Notes: Small, thickened specimens growing in bogs and other open places may be referred to *P. occidentalis* (E. Dahl) H. Krist. Scabrid material occurring in coastal localities may represent a separate taxon.

***Peltigera occidentalis* (E. Dahl) H. Krist.**

(Syn. *Peltigera neopolydactyla* (Gyelnik) Gyelnik s. lat.)

Frog pelt

Habitat/Range: Infrequent over moss in bogs and at margins of alpine tarns; global distribution unknown.

Contents: Dolichorrhizin, methyl gyrophorate, peltidactylin, tenuiorin and zeorin (and gyrophoric acid).

Notes: See notes under *P. lactucifolia*.

***Peltigera pacifica* Vitik.**

Frog pelt

Habitat/Range: Infrequent over soil, moss, and mossy logs in sheltered to shady coastal forests at lower elevations, also rare in humid intermontane localities (ICH zone); western N Am, S to OR.

Contents: Dolichorrhizin, methyl gyrophorate, peltidactylin, tenuiorin and zeorin (Vitikainen 1985).

Notes: The type locality is 10 km north of Kitsumkalum Lake, near Terrace, B.C.

***Peltigera polydactylon* (Necker) Hoffm.**

Frog pelt (many-fruited dog lichen)

Habitat/Range: Infrequent over soil, moss, mossy rocks and logs in open but humid inland forests; circumpolar, S to OR.

Contents: Tenuiorin, various unknown substances (and gyrophoric acid).

***Peltigera ponojensis* Gyelnik**

Felt pelt

Habitat/Range: Frequent over soil or moss in open inland forests and steppes, especially in dry to arid regions; circumpolar, S to CA.

Contents: No lichen substances reported.

Notes: The B.C. material includes several specimens lacking tomentum over the upper surface. These possibly deserve separate taxonomic recognition.

***Peltigera praetextata* (Flörke ex Sommerf.) Zopf**

Born-again pelt (rough dog lichen)

Habitat/Range: Infrequent over soil, moss, and mossy rocks and logs in open or sheltered forests in humid regions at lower elevations throughout, except rare in coastal localities; circumpolar, S to CA.

Contents: No lichen substances reported.

Notes: The material traditionally assigned to this species is clearly heterogeneous.

***Peltigera retifoveata* Vitik.**

Sponge pelt

Habitat/Range: Infrequent over moss in somewhat sheltered inland forests, especially in boreal regions; western N Am–western Eurasia, N to AK, YU, S to WA.

Contents: Dolichorrhizin, methyl gyrophorate, tenuiorin, zeorin, (gyrophoric acid and one unknown triterpenoid) (Vitikainen 1985).

***Peltigera rufescens* (Weis) Humb.**

Felt pelt

Habitat/Range: Frequent over soil or moss in open, often somewhat exposed sites throughout; circumpolar, S to CA.

Contents: No lichen substances reported.

***Peltigera scabrosa* Th. Fr.**

Toad pelt

Habitat/Range: Infrequent over moss and mossy rock in somewhat open inland sites; circumpolar, S to MT.

Contents: Dolichorrhizin, peltidactylin, zeorin and various unidentified substances (Holtan-Hartwig 1988).

Notes: Northern material should be carefully checked against *P. scabrosella* Holt.-Hartw., recently reported for the Yukon (Goward et al. 1994b), but not yet for B.C. In that species, the outermost rhizines are pale and the lower surface is essentially pale throughout.

***Peltigera venosa* (L.) Hoffm.**

Fan pelt (fan lichen)

Habitat/Range: Frequent over base-rich soil, especially cut banks, in open or somewhat sheltered sites throughout; circumpolar, S to CA.

Contents: Green phototype: phlebic acid A and B, tenuiorin, zeorin and one unidentified substance (Kurokawa et al. 1966); blue-green phototype: no lichen substances reported (Tønsberg and Holtan-Hartwig 1983).

Notes: The cephalodia of *P. venosa* may become detached and develop into the tiny, *Leptogium*-like lobules often found growing at the base of this species.

***Peltigera* sp. 1.**

(Syn. *Peltigera aphthosa* aggregate)

Freckle pelt

Habitat/Range: Frequent over moss and mossy rocks and logs in sheltered forests, usually at higher elevations, especially in ESSF zone, but also rarely in coastal forests; apparently western N Am – eastern N Am–western Eurasia, N to AK, S to OR.

Contents: Tenuiorin and various unidentified terpenoids.

Notes: The B.C. material is similar to *Peltigera* sp. 1 of Holtan-Hartwig (1993) — from which it differs in having entirely corticate apothecial reverses and in lacking hairs over the inner portions of the upper surface. It is also very similar to the Asiatic species *P. nigripuncta* Bitter. *Peltigera* sp. 1 is tolerant of prolonged snow cover.

PELTULA

***Peltula* Nyl.**

The Rock-olive Lichens

Minute, stratified foliose lichens (ours), **umbilicate**, rotund to subrotund, corticate above and below, **sorediate** (ours), usually without distinct lobes, thallus averaging to 3–10 mm across, rather thick. Upper surface **pale olive-grey**, with down-rolled margins. Lower surface pale brown, lacking rhizines. **Photobiont blue-green**.

Apothecia are unknown in the B.C. material.

Over vertical rock.

Reference: Wetmore (1971).

Common Name: Describes the habitat and colour of the upper surface.

Notes: *Peltula*, with approximately 18 species worldwide, occurs primarily at temperate latitudes in arid regions. Of the 15 species reported for North America, only one is known to occur in B.C.

***Peltula euploca* (Ach.) Ozenda & Clauz.**

Map 77

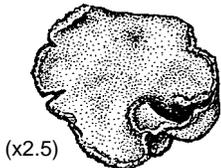
(Syn. *Heppia euploca* (Ach.) Vainio)

Rock-olive

Habitat/Range: Rare over vertical acid rock in open, semi-arid intermontane localities (BG and PP zones); western N Am–eastern N Am – western Eurasia, N to BC, S to MX.

Reactions: All spot tests negative.

Contents: No lichen substances reported.



(x2.5)

PHAEOPHYSCIA

***Phaeophyscia* Moberg**

The Shadow Lichens

Small to medium **stratified foliose lichens**, corticate above and below, isidiate or sorediate or not, lobes closely appressed to semi-erect, **elongate-linear to elongate** (rarely short), averaging to 0.2–1.5 (–3) mm wide, thin. Upper surface usually **brownish, K-** (atranorin absent), dull, lacking pruina and white-spotting. Lower surface dark brown to black, occasionally pale, bearing scattered, short, **simple rhizines**. Medulla white (ours). Photobiont green.

Apothecia located over upper surface, averaging to 1–2.5 mm across, rim occasionally bearing short colourless hairs, disc dark; spores 2-celled, ellipsoid to spindle-shaped, brown, 8 per ascus.

Over rock, bark, moss and other substrates.

References: Esslinger (1977b, 1978b); Moberg (1977).

Common Name: Alludes to the dark colour of the upper surface of most species.

Notes: Of the 19 species of *Phaeophyscia* reported for North America, ten are known to occur in B.C. *Phaeophyscia* was formerly treated within *Physcia*.

1a Lobes averaging to more than 2 mm wide; upper surface usually distinctly concave at lobe tips(←); rhizines strongly projecting beyond lobe tips; intermontane; rare *Phaeophyscia hispidula*

1b Lobes averaging to less than 1.5 mm wide; upper surface convex to rarely concave at lobe tips; rhizines projecting or not; distribution and status various 2

2a Thallus lacking soredia and isidia; apothecia present or absent 3

3a Lobes mostly semi-erect; lower surface pale; apothecia rare *Phaeophyscia constipata*

3b Lobes mostly appressed; lower surface black toward thallus centre; apothecia often present(←) 4

4a Lobes often averaging to less than 0.6 mm wide; over rock (very rare over bark) *Phaeophyscia endococcinea*

4b Lobes averaging to more than 0.6 mm wide; over bark (rare over mossy rock) *Phaeophyscia ciliata*

5a Thallus distinctly sorediate and/or isidiolate (check lower surface of lobe margins); apothecia generally absent 5

5b Thallus distinctly sorediate, soredia usually finely granular, never coralloid-branched; upper surface pale or brownish, never dark brown 6

6a Soralia restricted to lower surface along lobe margins and/or lobe tips(←); rhizines never projecting past lobe tips; semi-arid intermontane; rare *Phaeophyscia hirsuta*

6b Soralia variously distributed, but usually in part well developed over upper surface (including along lobe margins); rhizines often distinctly projecting past lobe tips; widespread; common 7

7a Soralia mostly finely granular, located primarily over upper surface(←) and near the lobe margins; common; widespread *Phaeophyscia orbicularis*

7b Soralia coarsely granular, located mostly over (upper surface of) lobe tips(←) and along lobe margins; rare, in B.C. known only in eastern intermontane localities *Phaeophyscia adiaetola*

8

8a Lobes averaging to more than 0.8 mm wide; isidia occasionally bearing minute, erect hairs; rhizines generally distinctly protruding beyond lobe tips(←); over bark or mossy rock *Phaeophyscia kairamoi*

8b Lobes averaging to less than 0.8 mm wide; isidia never hairy; rhizines generally not distinctly protruding beyond lobe tips; usually over rock, occasionally over mossy rock 9

9a Lobes minute, averaging to less than 0.5 mm wide; lower surface pale; southern intermontane; rare *Phaeophyscia nigricans*

9b Lobes small, but not minute, averaging to more than 0.5 mm wide; lower surface blackening toward thallus centre; widespread; common *Phaeophyscia sciastra*

***Phaeophyscia adiastrata* (Essl.) Essl.**

Map 78

(Syn. *Physcia adiastrata* Essl.)

Granulated shadow

Habitat/Range: Rare over mossy base-rich rocks and deciduous trees and shrubs in intermontane regions at lower elevations; western N Am – eastern N Am, N to BC, S to AZ.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Phaeophyscia ciliata* (Hoffm.) Moberg**

Map 79

(Syn. *Physcia ciliata* (Hoffm.) Du Rietz)

Starburst shadow

Habitat/Range: Rare over deciduous shrubs in open forests at lowland elevations throughout; probably circumpolar, N to BC, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Phaeophyscia constipata* (Norrlin & Nyl.) Moberg**

(Syn. *Physcia constipata* Norrlin & Nyl.)

Pincushion shadow

Habitat/Range: Frequent over base-rich moss and mossy rock in open to somewhat sheltered intermontane sites, usually at lower elevations; N Am – western Eurasia, N to AK, S to CO.

Reactions: All spot tests negative, except lower medulla rarely K+ violet.

Contents: No lichen substances reported, except an unidentified anthraquinone rarely present.

***Phaeophyscia endococcina* (Körber) Moberg**

(Syn. *Physcia decolor* Essl.; *Physcia endococcina* (Körber) Th. Fr.)

Starburst shadow

Habitat/Range: Frequent over base-rich rock in open intermontane localities; probably circumpolar, N to AK, S to NM.

Reactions: All spot tests negative.

Contents: Zeorin.

***Phaeophyscia hirsuta* (Mereschk.) Essl.**

Map 80

(Syn. *Physcia hirsuta* Mereschk.)

Powdered shadow

Habitat/Range: Rare over rock and deciduous trees (ornamental) in open semi-arid intermontane localities at lower elevations; probably western N Am – western Eurasia, N to BC, S to CA.

Reactions: All spot tests negative.

Contents: (Zeorin.)

***Phaeophyscia hispidula* (Ach.) Essl.**

Map 81

(Syn. *Physcia hispidula* (Ach.) Frey)

Whiskered shadow

Habitat/Range: Rare over deciduous shrubs and mossy rock in sheltered inland localities at lower elevations; probably incompletely circumpolar, N to BC, S to AZ.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Notes: Two subspecies appear to be present in B.C.:

1a Soredia/isidia restricted to lobe margins ssp. *limbata* Poelt

1b Soredia/isidia located over upper surface near lobe tips ssp. *hispidula*

***Phaeophyscia kairamoi* (Vainio) Moberg**

(Syn. *Physcia kairamoi* Vainio)

Whiskered shadow

Habitat/Range: Infrequent over deciduous shrubs and mossy rock in sheltered inland localities at lower elevations; N Am – western Eurasia, N to BC, S to AZ.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Phaeophyscia nigricans (Flörke) Moberg

Map 82

(Syn. *Physcia nigricans* (Flörke) Stizenb.)

One-horse shadow

Habitat/Range: Rare over base-rich bark or rock in sheltered intermontane localities at lower elevations; western N Am – western Eurasia, N to BC, S to CO.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Phaeophyscia orbicularis (Necker) Moberg

(Syn. *Physcia orbicularis* (Necker) Poetsch)

Granulated shadow

Habitat/Range: Frequent over rock and deciduous trees and shrubs in sheltered sites at lower elevations throughout, except possibly absent from boreal regions; probably incompletely circumpolar, N to BC, S to CA.

Reactions: All spot tests negative.

Contents: (Zeorin.)

Notes: The B.C. material may be heterogeneous.

Phaeophyscia sciastra (Ach.) Moberg

(Syn. *Physcia sciastra* (Ach.) Du Rietz)

Five o'clock shadow

Habitat/Range: Common over base-rich rock in open to somewhat sheltered sites throughout; circumpolar, N to AK, S to AZ.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

PHYLLISCUM

Phylliscum Nyl.

The Tripe Lichens

Minute stratified foliose lichens, corticate above and below, lacking isidia and soredia, lobes **attached to substrate by a more or less central holdfast**, rotund to subrotund, thallus averaging to 0.8–3.0 mm across, rather thick. Upper and lower surfaces **brownish black**, shiny, lacking rhizines. Medulla white. **Photobiont blue-green**.

Apothecia located over upper surface, immersed, perithecia-like (blackish dots as seen from above); spores simple, oval, colourless, 16 per ascus (ours).

Reference: Henssen (1963e).

Common Name: Alludes to the general resemblance of the species to certain "Rocktripes" of the genus *Umbilicaria*.
Notes: *Phylliscum* is a primarily temperate genus of approximately six species, only one of which is known to occur in North America.

For points of distinction with similar lichens, see Key B, page 17.

Phylliscum demageonii (Moug. & Mont. in Mont.) Nyl.

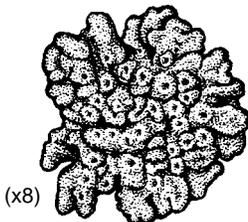
Map 83

Lizard tripe

Habitat/Range: Rare (overlooked?) over rock in somewhat sheltered sites in coastal localities at lower elevations, also reported in the Alberta Rockies; incompletely circumpolar, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.



PHYSICIA

Physcia (Schreber) Michaux

The Rosette Lichens

Small to occasionally medium **stratified foliose lichens**, corticate above and below, sorediate or isidiate or not, lobes closely appressed to loosely attached, elongate-linear to elongate, averaging to **0.5–2 (–3) mm wide**, thin. Upper surface usually **pale whitish grey**, rarely darker, **K+ yellow, white-pruinose or white-spotted, dull**. Lower surface pale to blackish, dull, bearing scattered, short, simple rhizines. Medulla white. Photobiont green. Apothecia located over upper surface, disc white-pruinose to black; spores 2-celled, ellipsoid, brown, 8 per ascus. Over acid or especially **calcium-rich substrates**, including rock, soil, duff, bark and bone. Reference: Moberg (1977).

Common Name: Describes the centrifugal growth form characteristic of many of the species.

Notes: Thirty species of *Physcia* are reported for North America and 11 of these are known to occur in B.C. *Physcia* has been subdivided into several segregate genera, including *Phaeophyscia* and *Physconia*.

1a Lobe margins bearing distinct cilia(←), the longest of these usually averaging to more than 1 mm long; lobe tips more or less raised 2

2a Lobe tips lacking isidia and soredia (check lower surface); over trees; coastal; rare *Physcia semipinnata*

2b Lobe tips sorediate and/or apparently isidiate; ecology, distribution and status various 3

3a Lobe tips isidiate and/or coarsely sorediate; marginal cilia very sparse; over rock; semi-arid intermontane; rare *Physcia callosa* (see lead **7a**)

3b Lobe tips finely sorediate; marginal cilia numerous; over trees (rare over rock); widespread; frequent 4

4a Upper and lower surface of lobe tips separating, upper surface raised and hood-like when mature (←); soredia developing within the resulting cavity *Physcia adscendens*

4b Upper surface of lobe tips never hood-like; lower surface of lobe tips eroding, eventually sorediate(←) *Physcia tenella*

1b Lobe margins lacking cilia (Note: marginal rhizines may occur in some species, but these average to less than 0.8 mm long); lobe tips appressed 5

5a Thallus sorediate, isidiate or distinctly lobulate 6

6a Upper surface distinctly white-pruinose, especially near lobe tips; white-spotting absent or inconspicuous; soredia/isidia originating primarily at lobe tips and along lobe margins, spilling onto the upper surface when mature; usually over bark (rare over rock); semi-arid montane; medulla K- or K+ slowly dingy orange *Physcia dimidiata*

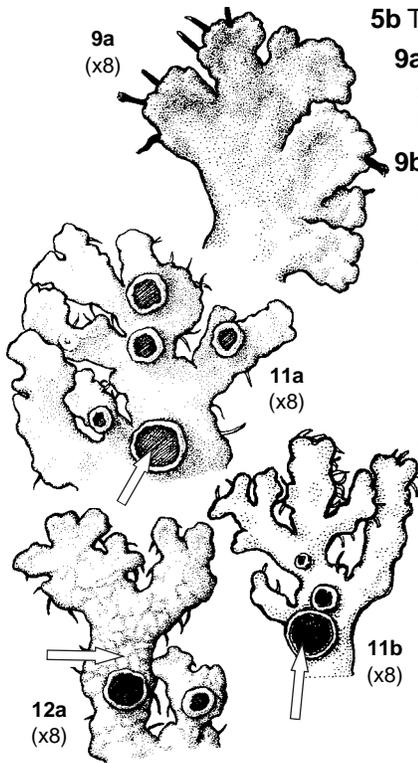
6b Upper surface not distinctly white-pruinose; white-spotting conspicuous or not; soredia/isidia variously positioned; usually over rock (rare over bark); distribution and chemistry various 7

7a Lobe tips terminating in tiny bead-like isidia(←), these often coarsely sorediate when mature, occasionally massing at lobe tips and along margins; semi-arid intermontane; rare; medulla K- *Physcia callosa*

7b Lobe tips often finely sorediate, but never beaded-isidiate; distribution and chemistry various; frequent 8

8a Soredia located mostly on lower surface of (somewhat raised) lobe tips(←), sometimes also over lobe margins; white-spotting generally absent or indistinct over upper surface; medulla K- *Physcia dubia*

8b Soredia located mostly over upper surface(←), but also occasionally in part as above; upper surface often distinctly white-spotted; medulla K+ yellow *Physcia caesia*



- 5b Thallus lacking soredia, isidia and lobules 9
- 9a Upper surface distinctly white-pruinose throughout, pale, lacking distinct white-spotting; over rock (rare over bark); semi-arid intermontane; medulla K- or occasionally K+ dingy pink **Physcia biziana**
- 9b Upper surface never distinctly white-pruinose throughout (pruina, if present, confined to area of the lobe tips), pale or darkening, often distinctly pale-spotted; ecology, distribution and chemistry various 10
- 10a Over bark; medulla K- or K+ yellow 11
 - 11a Apothecial discs usually (but not always) distinctly white-pruinose(←); widespread; medulla K+ yellow **Physcia aipolia**
 - 11b Apothecial discs usually dark(←); primarily boreal; medulla K- **Physcia stellaris**
- 10b Over other substrates, including rock, bone, mosses over rock; medulla K+ yellow 12
 - 12a Apothecial discs dark, not at all white-pruinose; upper surface often darkening toward thallus centre(←); mature spores usually less than 17 μ long **Physcia phaea**
 - 12b Apothecial discs usually distinctly white-pruinose; upper surface pale throughout; mature spores usually more than 18 μ long **Physcia aipolia** (see lead 11a)

Physcia adscendens (Fr.) H. Olivier

Hooded rosette (hood lichen)

Habitat/Range: Common over base-rich trees and rock in open to somewhat shady sites throughout, though mostly at lowland elevations; circumpolar, N to AK, S to CA.

Reactions: Cortex K+ yellow.

Contents: Atranorin.

Notes: This species may sometimes intergrade with *P. tenella*.

Physcia aipolia (Ehrh. ex Humb.) Fűrnr.

Grey-eyed rosette (goat lichen, hoary rosette)

Habitat/Range: Common over base-rich deciduous trees and shrubs (also rare over rock) in open sites at lower elevations throughout, except probably absent from hypermaritime regions; circumpolar, N to AK, S to MX.

Reactions: Cortex K+ yellow; medulla K+ yellow.

Contents: Atranorin and zeorin.

Notes: Two varieties are reported to occur in B.C., though only var. *alnophila* has been seen by the authors. A few specimens are similar to var. *aipolia* morphologically, but in these the spores are shorter than 22 μ. See also notes under *Physcia phaea*.

1a Apothecia present almost to lobe tips, gradually larger toward thallus centre; spores usually less than 22 μ long var. **alnophila (Vainio) Lyngø**

1b Apothecia restricted to central portions of thallus, intermixed large and small; spores usually more than 22 μ long var. **aipolia**

Physcia biziana (Massal.) Zahlbr.

Map 84

Frosted rosette

Habitat/Range: Frequent over base-rich rock (rare over bark) in open semi-arid intermontane sites at lower elevations; western N Am – western Eurasia, N to BC, S to MX.

Reactions: Cortex K+ yellow.

Contents: Atranorin.

Notes: Specimens having a K+ finally pinkish medullary reaction may be referred to *P. magnussonii* Frey.

***Physcia caesia* (Hoffm.) Fűrnr.**

Powered rosette (blue-grey blister lichen)

Habitat/Range: Frequent over base-rich rock (rare over bark) in open to somewhat sheltered sites throughout; circumpolar, N to AK, S to AZ.

Reactions: Cortex K+ yellow; medulla K+ yellow.

Contents: Atranorin and zeorin.

Notes: Forms of *P. caesia* with soredia located primarily at the lobe tips are sometimes recognized as a separate species, *P. wainioi* Räsänen.

***Physcia callosa* Nyl.**

Map 85

Beaded rosette

Habitat/Range: Rare over base-rich rock in open to somewhat sheltered semi-arid intermontane localities at lower elevations; western N Am, N to BC, S to AZ.

Reactions: Cortex K+ yellow; medulla K-.

Contents: Atranorin.

***Physcia dimidiata* (Arnold) Nyl.**

Map 86

Frosted rosette

Habitat/Range: Infrequent over shrubs in open to somewhat sheltered sites at lower elevations in the semi-arid intermontane, also rare over base-rich rock; western N Am – western Eurasia, N to BC, S to CO.

Reactions: Cortex K+ yellow.

Contents: Atranorin.

***Physcia dubia* (Hoffm.) Lettau**

Powdered rosette

Habitat/Range: Frequent over base-rich rock in open sites throughout; circumpolar, N to AK, S to CA.

Reactions: Cortex K+ yellow.

Contents: Atranorin.

***Physcia phaea* (Tuck.) Thomson**

Black-eyed rosette

Habitat/Range: Infrequent over acid rock in open inland sites at lower elevations, also rare in lowland maritime localities; N Am – western Eurasia, N to AK, S to CA.

Reactions: Cortex K+ yellow; medulla K+ yellow.

Contents: Atranorin and zeorin.

Notes: Pale, coastal forms of *P. phaea* with inconspicuous white-spotting are sometimes referred to *P. cascadenis* Magnusson. The spores in *P. phaea* are smaller than those in the closely related *P. aipolia*. This character is sometimes difficult to apply because of overlap in spore size. Typical spore lengths in the B.C. material are 16–18 (–20) μ for *P. phaea* and 17–25 μ for *P. aipolia*.

***Physcia semipinnata* (J.F. Gmelin) Moberg**

Map 87

(Syn. *Physcia leptalea* (Ach.) DC.)

Fringed rosette

Habitat/Range: Rare over conifers in sheltered coast forests at lower elevations; western N Am – eastern N Am – western Eurasia, N to BC, S to NM.

Reactions: Cortex K+ yellow.

Contents: Atranorin.

Notes: Known to occur in a single locality in the lower Fraser Valley (Goward and Thor 1992).

***Physcia stellaris* (L.) Nyl.**

Map 88

Black-eyed rosette (grey star lichen)

Habitat/Range: Rare over (base-rich) deciduous trees in open intermontane and especially boreal regions; circumpolar, N to BC, S to MX.

Reactions: Cortex K+ yellow.

Contents: Atranorin.

Physcia tenella (Scop.) DC in Lam. & DC.

Fringed rosette

Habitat/Range: Frequent over (base-rich) trees and shrubs (infrequent over rock) in open to somewhat sheltered coastal sites, also rare in intermontane localities; probably incompletely circumpolar, N to BC, S to CA.

Reactions: Cortex K+ yellow.

Contents: Atranorin.

PHYSCONIA

Physconia Poelt

The Frost Lichens

Medium stratified foliose lichens, corticate above and below (ours), sorediate or isidiate or not, lobes appressed to loosely attached, elongate, averaging to 0.5–2 (–3) mm wide, thin. Upper surface brownish, except often **heavily white-pruinose**, K-, dull to somewhat shiny. Lower surface pale to more often blackish, dull, bearing numerous **squarrose rhizines**. Medulla white or occasionally pale yellow. Photobiont green.

Apothecia located over upper surface, disc white-pruinose; spores 2-celled, ellipsoid, brown, 8 per ascus.

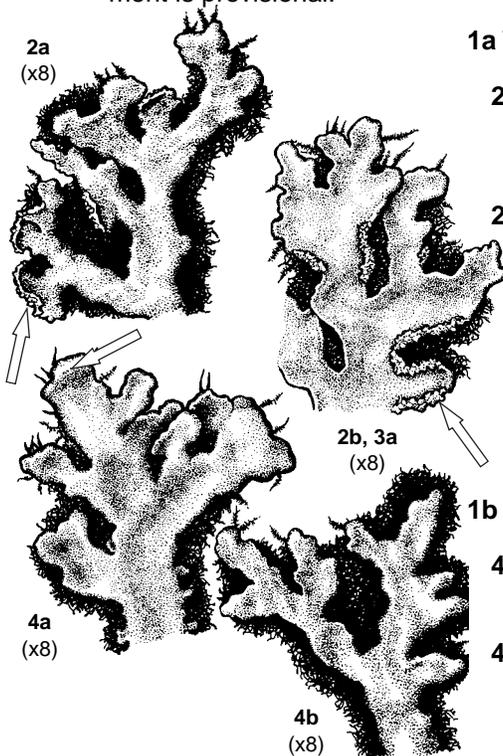
Over **calcium-rich substrates**, including rock, soil, duff, bark and bone.

Reference: Moberg (1977).

Common Name: Alludes to the characteristic presence of white pruina over the upper surface of the species.

Notes: Seven species of *Physconia* are reported for North America and five of these are known to occur in B.C.

Chemistry is of little taxonomic importance in this genus, with the exception of the K+ yellow medullary reaction of *P. enteroxantha*. See, however, the notes under that species. The species currently assigned to *Physconia* were formerly treated within *Physcia*. The genus is under taxonomic review by T. Esslinger; the following treatment is provisional.



- 1a Thallus bearing soredia and/or isidia (check lobe tips) 2
- 2a Soredia/isidia mostly confined to lower surface, especially at lobe tips(←); lobe tips upturned; lower surface pale, darkening only gradually toward thallus centre **Physconia perisidiosa**
- 2b Soredia/isidia mostly confined to marginal soredia(←), these not reaching lobe tips; lobe tips more or less appressed; lower surface darkening abruptly toward thallus centre 3
- 3a Medulla pale yellowish, K+ yellow; upper surface generally strongly pruinose, dull **Physconia enteroxantha**
- 3b Medulla white, K-; upper surface at most only weakly pruinose, often somewhat shiny **Physconia deterosa**
- 1b Thallus lacking soredia and isidia 4
- 4a Over bark or wood; lobe tips generally appressed(←); apothecia usually present; rare **Physconia distorta**
- 4b Over soil, duff or mosses (rare also over bark at bases of shrubs); lobe tips often somewhat upturned; apothecia rare; common **Physconia muscigena**

Physconia deterosa (Nyl.) Poelt

Map 89

Bottlebrush frost

Habitat/Range: Rare over coniferous and probably deciduous trees in open sites at lower elevations in boreal localities; probably incompletely circumpolar, N to AK, S to CO.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Notes: See notes under *P. enteroxantha*.

***Physconia distorta* (With.) Laundon**

Map 90

(Syn. *Physconia pulverulenta* auct. non (Schreber) Poelt; *Physconia pulverulacea* Moberg in Gunnerb. & Moberg)

Grey-eyed frost

Habitat/Range: Rare over base-rich deciduous shrubs in open transition maritime–intermontane forests at lower elevations; probably western N Am – western Eurasia, N to BC, S to AZ.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Physconia enteroxantha* (Nyl.) Poelt**

Bordered frost

Habitat/Range: Frequent over deciduous trees, shrubs and (mossy) base-rich rocks in open maritime and intermontane sites at lower elevations; probably incompletely circumpolar, N to AK, S to CA.

Reactions: Medulla K+ yellow.

Contents: One unidentified lichen substance.

Notes: The K+ yellow reaction is spotty and difficult to demonstrate in a small percentage of the specimens examined. Such material would key out as *P. detersa*, though the upper surface of that species is usually rather shiny and not heavily white-pruinose as in *P. enteroxantha*. *Physconia detersa* also appears to have a strictly boreal distribution in B.C.

***Physconia muscigena* (Ach.) Poelt**

Ground frost

Habitat/Range: Common over base-rich moss and humic soil and infrequent over base of shrubs, in open to somewhat sheltered inland sites; circumpolar, N to AK, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Physconia perisidiosa* (Erichsen) Moberg**

Bordered frost

Habitat/Range: Infrequent over deciduous trees, shrubs and (mossy) base-rich rocks at lower elevations in open maritime and intermontane sites; probably incompletely circumpolar, N to BC, S to CO.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

PLACYNTHIUM

***Placynthium* (Ach.) Gray**

The Brownette Lichens

Minute to small **stratified to nonstratified foliose or occasionally squamulose lichens**, corticate above and below, isidiate or not, lobes closely appressed or partly semi-erect, elongate-linear, linear or occasionally short, averaging to (0.1–) 0.2–0.8 (–1.5) mm wide, thin. Upper surface **dark olive-brown** or blackish, smooth or longitudinally striate. Lower surface dark or occasionally pale, bearing **blue-green** or occasionally pale rhizines, these often extending outward from thallus as **prothallus**. Medulla white. **Photobiont blue-green**.

Apothecia located over upper surface, disc dark brown to black; spores 2- to 4-celled, ellipsoid to somewhat spindle-shaped/fusiform, colourless, (4-) 8 per ascus.

Over rock, rarely over bark.

Reference: Henssen (1963d).

Common Name: Stresses the miniature size and superficial resemblance to certain species of “brown” lichens (e.g., *Melanelia* and *Neofuscelia*).

Notes: *Placynthium* is primarily a temperate genus, consisting of approximately 25 species worldwide. Of the six species occurring in North America, five are reported from B.C. In this taxonomically rather difficult genus, conclusive identification of some species requires detailed anatomical studies (see Henssen 1963d).

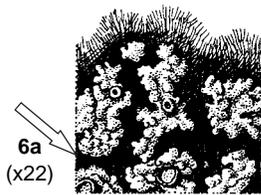
No lichen substances have been reported.

Key to *Placynthium* and Similar Lichens

- 1a Thallus umbilicate: attached to substrate by thickened, more or less central holdfast/umbilicus 2
 - 2a Lobes thin or at least not distinctly swollen along margins; over acid rock; coastal (*Spilonema revertens*)
 - 2b Lobes distinctly swollen along margins; over base-rich rock; inland *Collema callopismum*

- 1b Thallus broadly or narrowly attached to substrate, but not umbilicate 3
 - 3a Thallus blackish; lobes distinctly swollen; over soil *Collema tenax* var. *corallinum*
 - 3b Thallus brownish; lobes not at all swollen; substrate various 4

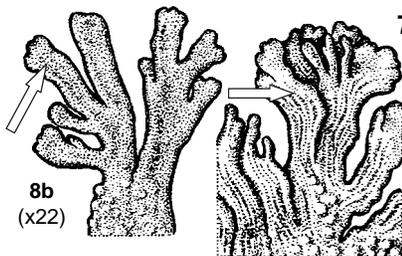
- 4a Lobes predominantly erect; over soil or bark *Leptogium*
- 4b Lobes either mostly appressed to substrate or, if erect, then over rock 5



- 5a Lower surface and rhizines blue-green or blackish 6

- 6a Peripheral lobes scalelike/isodiametric and strongly disjointed(←), usually bordered by distinct, darkened hypothallus which also usually borders the thallus as a whole *Placynthium nigrum*

- 6b Peripheral lobes essentially continuous with thallus, elongate or short, but never scalelike; hypothallus inconspicuous or absent 7

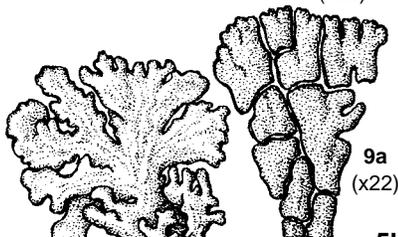


- 7a Over acid rock; lobes occasionally averaging to more than 0.2 mm wide; thallus never forming concentric rings 8

- 8a Peripheral lobes averaging to less than 0.2 mm wide, often shiny and either convex or weakly channelled(←); "isidia," if present, more or less erect, granular to more often elongate-cylindrical *Placynthium asperellum*

- 8b Peripheral lobes averaging to more than 0.2 mm broad, usually dull and either plane or weakly grooved(←); "isidia," if present, more or less appressed, usually granular or flattened (rarely cylindrical) *Placynthium flabellosum*

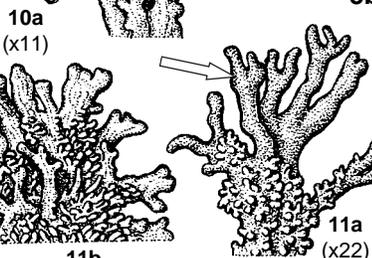
- 7b Over base-rich rock; lobes averaging to 0.2 mm wide or less; thallus sometimes forming concentric rings 9



- 9a Upper surface of peripheral lobes distinctly flattened and usually crowded/contiguous at tips; thallus often ring-forming *Placynthium subradiatum*

- 9b Upper surface of peripheral lobes concave and distinctly longitudinally grooved; lobe tips separate to rarely crowded; thallus usually not ring-forming *Placynthium asperellum* (see lead 8a)

- 5b Lower surface pale 10



- 10a Lowland maritime, probably restricted to CDF zone *Koerberia sonomensis*

- 10b Inland or, if occurring west of coast ranges, then restricted to upland localities ... 11

- 11a Peripheral lobes strongly convex(←), averaging to less than 0.2 mm wide; over limestone *Placynthium stenophyllum* var. *isidiatum*

- 11b Peripheral lobes more or less flattened, averaging to more than 0.2 mm wide; over acid or base-rich rock, but never over limestone *Vestergrenopsis*

***Placynthium asperellum* (Ach.) Trev.**

(Syn. *Placynthium aspratile* (Ach.) Henssen)

Brownette

Habitat/Range: Infrequent over seasonally wetted rock in open, inland localities; circumpolar, S to CO.

Placynthium flabellusum (Tuck.) Zahlbr.

Map 91

Brownette

Habitat/Range: Rare over seasonally wetted acid rock in open, intermontane localities at lower elevations; probably circumpolar, S to CA.

Notes: The anatomy of this species is unique among North American *Placynthium* species, the thallus being comprised of close-fitted, angular cells. In all other species, the cells are rounded when viewed in longitudinal section (see Henssen 1963d).

Placynthium nigrum (Hudson) S. Gray

Map 92

Quilted brownette

Habitat/Range: Frequent over base-rich rock in open localities throughout; circumpolar, S to CA and AZ.

Notes: Only var. *nigrum* has been recorded from B.C., though var. *tantaleum* (Hepp) Arnold is known to occur in Jasper National Park and may yet be found west of the continental divide.

1a Spores 2-, 3- or 4-celled, narrow-ellipsoid, 3.5–5.5 μ wide var. *nigrum*

1a Spores 1- or 2-celled, broad-ellipsoid, 6–8 μ wide [var. *tantaleum* (Hepp) Arn]

Placynthium stenophyllum (Tuck.) Fink

Map 93

Brownette

Habitat/Range: Infrequent over base-rich rock in open intermontane localities; western N Am, S to AZ.

Notes: The B.C. material can be assigned to var. *isidiatum* Henssen. The type locality of this variety is near Crown Lake in Marble Canyon, near Lillooet, B.C.

Placynthium subradiatum (Nyl.) Arn.

Map 94

Brownette

Habitat/Range: Rare over (seasonally wetted) base-rich rock in open, inland localities; tentatively western N Am – western Eurasia, S to AZ.

Notes: Some specimens can be separated from *P. flabellusum* only on the basis of anatomical studies. See the notes under that species.

PLATISMATIA

Platismatia Culb. & C. Culb.

The Rag Lichens

Medium to large stratified foliose lichens, corticate above and below, sorediate or isidiate or not, lobes **loosely appressed to semi-erect**, elongate to short, **often irregular**, averaging to 3–20 mm wide, thin. Upper surface pale green to whitish or whitish blue, pseudocyphellate or not. **Lower surface usually black toward thallus centre**, shiny, bearing sparse, short, simple rhizines. Medulla white. Photobiont green.

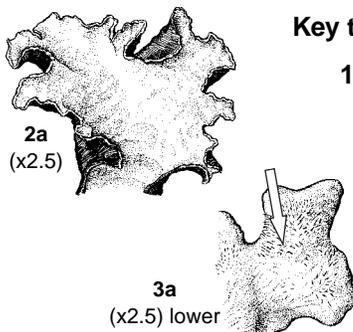
Apothecia located on or near lobe margins, disc brown, often perforate; spores simple, ellipsoid, colourless, 8 per ascus.

Over **trees and shrubs**, occasionally over logs, rarely over rock.

Reference: Culberson and Culberson (1968).

Common Name: Describes the whitish, often somewhat torn or tattered lobes of species.

Notes: *Platismatia* is primarily a temperate genus consisting of about 10 species. Of the six species reported for North America, five occur in B.C.



Key to *Platismatia* and Similar Lichens

- 1a Soredia present, occasionally intermixed with isidia 2
- 2a Pseudocyphellae absent over upper surface; soredia often intermixed with isidia; widespread; medulla C- ***Platismatia glauca***
- 2b Upper surface more or less distinctly pseudocyphellate; isidia absent; mostly coastal (rarely intermontane); medulla C+ reddish or C- 3
- 3a Lower surface and rhizines pale tan to brown throughout(←) ***Punctelia subrudecta***

-
- 3b Lower surface and rhizines blackening 4
- 4a Upper surface greenish or yellowish; lower surface lacking pseudocyphellae; medulla C+ reddish *Flavopunctelia flaventior*
- 4b Upper surface pale bluish grey or almost white; lower surface pseudocyphellate; medulla C- *Cetrelia cetrarioides*
- 1b Soredia absent; isidia present or absent 5
- 5a Upper surface weakly yellowish; lower surface essentially black throughout; pycnidia located largely over upper surface(←) (check near lobe tips), often numerous; apothecia generally present; isidia absent *Esslingeriana idahoensis*
- 5b Upper surface whitish to very pale bluish or greenish, never yellowish (except specimens sometimes becoming yellowish in herbarium); lower surface often in part pale; pycnidia, if present, located entirely along lobe margins; apothecia generally absent; isidia present or absent 6
- 6a Lobes narrow, averaging to 1–3(–5) mm wide, elongate; upper surface smooth to weakly wrinkled 7
- 7a Isidia present along lobe margins(←) *Platismatia herrei*
- 7b Isidia absent *Platismatia stenophylla*
- 6b Lobes broader, averaging to 6–15 mm wide, short; upper surface smooth to strikingly ridged 8
- 8a Lobe margins more or less lacerate; upper surface smooth to occasionally broadly wrinkled; isidia, if present, irregularly scattered (i.e., not necessarily confined to ridges and/or lobe margins); widespread *Platismatia glauca* (see lead 2a)
- 8b Lobe margins more or less even; upper surface generally deeply wrinkled or ridged at maturity; isidia, if present, restricted to ridges and/or lobe margins; restricted to humid localities; essentially coastal 9
- 9a Upper surface strikingly net-ridged/reticulate, spaces between ridges deep and often bowl-like(←); isidia absent or rarely present along margins; medulla PD+ orangish red *Platismatia lacunosa*
- 9b Upper surface weakly to rather strongly net-ridged/reticulate, interspaces, however, remaining shallow and saucerlike(←); isidia generally present and located both over the upper surface ridges and along lobe margins; medulla PD- *Platismatia norvegica*

***Platismatia glauca* (L.) Culb. & C. Culb.**

Ragbag (pale shield)

Habitat/Range: Common over conifers and deciduous trees and shrubs, also infrequent over decaying logs and mossy rocks, in open to somewhat shady forests throughout, except essentially absent in boreal and arid intermontane regions; western N Am – eastern N Am – western Eurasia, N to AK, S to CA.

Reactions: Cortex K+ yellow.

Contents: Atranorin and caperatic acid.

***Platismatia herrei* (Imsh.) Culb. & C. Culb.**

Tattered rag

Habitat/Range: Frequent over conifers and deciduous trees in open to sheltered coastal forests at lower elevations; western N Am, N to AK, S to CA.

Reactions: Cortex K+ yellow.

Contents: Atranorin and caperatic acid.

Platismatia lacunosa (Ach.) Culb. & C. Culb.

Crinkled rag (lettuce lichen)

Habitat/Range: Infrequent over conifers, deciduous shrubs (especially alder) and rock in open maritime and especially hypermaritime localities at lower elevations; western N Am, N to AK, S to CA.

Reactions: Cortex K+ yellow; medulla PD+ orangish red.

Contents: Atranorin, caperatic acid and fumarprotocetraric acid.

Platismatia norvegica (Lyng.) Culb. & C. Culb.

Laundered rag

Habitat/Range: Frequent over conifers in open coastal forests at lower elevations, also rare in humid intermontane old-growth forests (ICH zone); western N Am – eastern N Am – eastern Eurasia, N to AK, S to CA.

Reactions: Cortex K+ yellow.

Contents: Atranorin and caperatic acid.

Platismatia stenophylla (Tuck.) Culb. & C. Culb.

Map 95

Ribbon rag (slender shield)

Habitat/Range: Infrequent over conifers in open coastal forests at lower elevations; western N Am, N to BC.

Reactions: Cortex K+ yellow.

Contents: Atranorin and caperatic acid.

PSEUDOCYPHELLARIA

Pseudocyphellaria Vainio

The Specklebelly Lichens

Large stratified foliose lichens, corticate above and below, sorediate or isidiate or not, lobes **loosely attached, short to somewhat elongate**, averaging to 6–20 (–30) mm wide, thin. Upper surface **greyish or brownish**, smooth or reticulate. Lower surface tomentose or not, **bearing pseudocyphellae, lacking rhizines**. Medulla white or occasionally yellow. **Photobiont green or blue-green**.

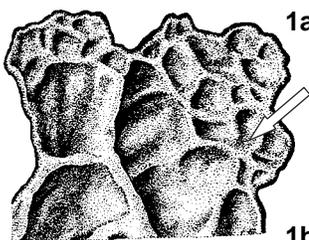
Apothecia located over upper surface or along lobe margins, disc brownish (except black when parasitized); spores 2-celled to multi-celled, spindle-shaped, colourless or brown when mature, 8 per ascus.

Over bark.

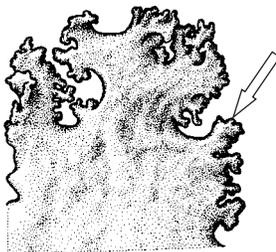
References: Magnusson (1940); Imshaug (1950); Ohlsson (1973).

Common Name: Alludes to the pale specks of pseudocyphellae occurring over the lower surface of the species.

Notes: *Pseudocyphellaria*, with approximately 200 species, is primarily a temperate genus of the southern hemisphere. Of the six species reported for North America, five occur in B.C. Spot tests are of little taxonomic value in this genus and have been omitted in the following species accounts.

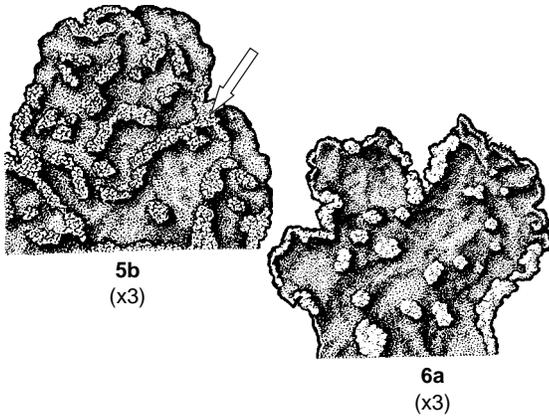


2a
(x3)



3a
(x3)

- 1a Soredia and isidia absent 2
- 2a Upper surface distinctly net-ridged/reticulate(←), interspaces deeply pitted; photobiont a dark blue-green cyanobacterium; apothecia common ***Pseudocyphellaria anthraspsis***
- 2b Upper surface more or less plane or at least not net-ridged; photobiont a green alga; apothecia unknown ***Pseudocyphellaria rainierensis*** (see lead 3a)
- 1b Soredia or isidia present 3
- 3a Isidia present, especially along lobe margins(←); soredia absent; medulla white; upper surface pale greenish grey (but turning brown in herbarium) ***Pseudocyphellaria rainierensis***
- 3b Isidia absent; soredia present; medulla white or yellow; upper surface brownish or greyish 4
- 4a Soredia whitish or greyish, never yellow; medulla white 5
- 5a Upper surface strongly net-ridged, interspaces deeply pitted; soralia sparse; apothecia often present; coastal (rare sorediate form of) ***Pseudocyphellaria anthraspsis*** (see lead 2a)



- 5b** Upper surface plane or, if somewhat ridged, then interspaces not deeply pitted, ridges bearing copious soralia(←); apothecia rare; widespread ***Pseudocyphellaria anomala***
- 4b** Soredia and/or pseudocyphellae distinctly yellow; medulla yellow or white 6
- 6a** Photobiont a dark blue-green cyanobacterium; medulla white to strong yellow (check fresh breaks in upper cortex); upper surface naked, greyish or brownish when wet; lobe margins naked ***Pseudocyphellaria crocata***
- 6b** Photobiont a grass-green alga; medulla bright yellow (fresh breaks); upper surface naked or occasionally hairy, distinctly greenish when wet ***Pseudocyphellaria aurata***

***Pseudocyphellaria anomala* Brodo & Ahti**

Netted specklebelly

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

***Pseudocyphellaria anthraxis* (Ach.) Magnusson**

Dimpled specklebelly (ear lichen)

Habitat/Range: Frequent over trees, especially conifers, in open maritime and especially hypermaritime forests at lower elevations; western N Am, N to AK, S to CA.

***Pseudocyphellaria aurata* (Sm.) Vainio**

Yellow specklebelly (rose-and-gold lichen)

Habitat/Range: Rare over deciduous trees in hypermaritime localities; incompletely circumpolar, S to OR.

Notes: The only record for B.C. is that of Benton et al. (1977) from Bamfield. Unfortunately, the specimen on which this report is based could not be located.

***Pseudocyphellaria crocata* (L.) Vainio**

Yellow specklebelly (gold-edge lichen, rags)

Habitat/Range: Infrequent over trees and shrubs in open coastal forests at lower elevations, also rare in intermontane old-growth forests (ICH zone); incompletely circumpolar, N to AK, S to OR.

Notes: Specimens in which the soredia are confined to the lobe margins are sometimes referred to *P. mougeotiana* (Del.) Vainio. See "Excluded Species."

***Pseudocyphellaria rainierensis* Imsh.**

Map 96

Old-growth specklebelly

Habitat/Range: Rare over trees and shrubs in humid coast old-growth forests at lower elevations; western N Am, S to OR.

PSORA

***Psora* Hoffm.**

The Scale Lichens

Small stratified squamulose lichens, corticate above, corticate or not below, nonsorediate, nonisidiate, squamules broadly attached to substrate or more often **attached at one margin**, closely appressed to loosely attached, short to more often subrotund, averaging to 2–5 (–8) mm wide, usually rather thick. Upper surface **pinkish or more often brownish**, somewhat shiny or not, often white-pruinose. Lower surface pale or darkening, **lacking rhizines**. Medulla white. Photobiont green.

Apothecia located over upper surface or along squamule margins, **disc usually convex or hemispherical when mature**, reddish brown to black; spores simple, ellipsoid, colourless, 8 per ascus.

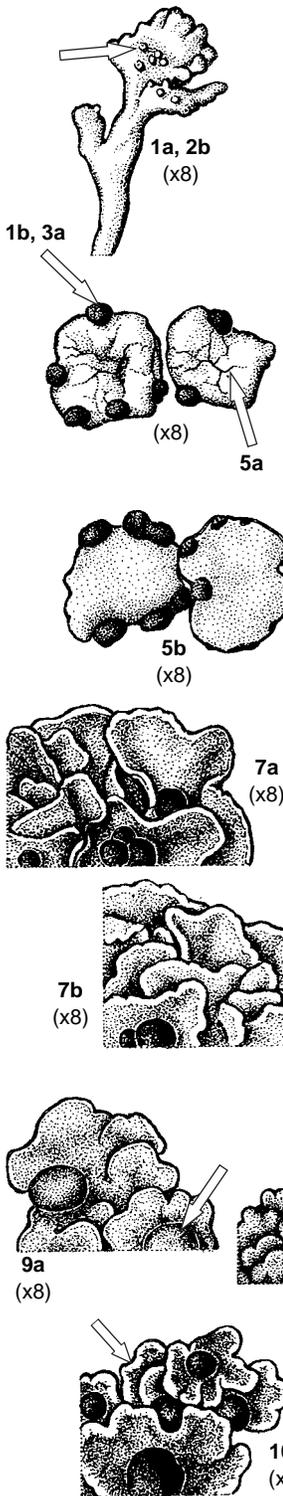
Over exposed, base-rich soil or rock.

Reference: Timdal (1986).

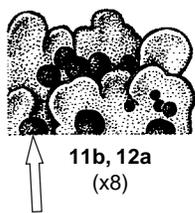
Common Name: Suggested by the tiny, rounded, often somewhat overlapping lobes of the species.

Notes: *Psora* is primarily a genus of semi-arid or arid areas, especially at temperate latitudes. Of the 17 species reported for North America, seven are found in B.C. This is a taxonomically difficult genus in which the species are not always clearly circumscribed.

Key to *Psora* and Similar Lichens



- 1a Growing directly over acid rock; lower surface dark, hard-corticate, never cottony; fruiting bodies (perithecia) immersed in upper surface, visible from above as blackish dots(←) ... 2
- 2a Lobes raised or appressed, distinctly thickened; lower surface black towards thallus centre; spores numerous, 1-celled; cortex KC+ reddish or KC- (*Acarospora thamnina*)
- 2b Lobes raised, usually rather thin; lower surface never black; spores 2 per ascus, muriform (i.e., with transverse and longitudinal septa); cortex KC- *Endocarpon pulvinatum*
- 1b Over soil, moss or occasionally base-rich rock; lower surface pale, sometimes cottony; fruiting bodies (apothecia) not immersed, usually hemispherical at maturity(←) 3
- 3a Apothecia black, situated primarily along lobe margins (check young apothecia); lobes closely appressed throughout; upper surface sometimes bright red 4
- 4a Lobes minute, averaging to less than 1 (-1.5) mm wide at maturity; upper surface dark brown, smooth; spores 2-celled (*Arthonia glebosa*)
- 4b Lobes larger, averaging to more than 2.5 mm wide at maturity, upper surface variously coloured, smooth to fissured; spores 1-celled 5
- 5a Upper surface pale (fleshy) brown, often heavily white-pruinose, usually strongly fissured(←); restricted to lowland localities *Psora cerebriformis*
- 5b Upper surface bright red to brownish red, usually not heavily white-pruinose, smooth to occasionally fissured; widespread *Psora decipiens*
- 3b Apothecia reddish brown, brown or black, situated primarily over upper surface of lobes (check young apothecia); lobes appressed or ascending; upper surface never bright red 6
- 6a Lobes distinctly ascending, often partly vertical; upper surface in part greenish (check sheltered lobes); apothecia often compound, black or brownish black 7
- 7a Lobes to 10 mm long (often smaller); upper surface medium green; lower surface white to pale brown; widespread *Psora nipponica*
- 7b Lobes to 4 mm long; upper surface yellowish green (check sheltered lobes); lower surface yellowish; restricted to northern alpine areas *Psora rubiformis*
- 6b Lobes appressed or at most weakly raised, not distinctly ascending; upper surface brownish; apothecia simple, black to reddish brown 8
- 8a Apothecia reddish brown to at most medium brown; upper surface generally pale reddish brown 9
- 9a Apothecia strongly convex(←), usually hemispherical; gyrophoric acid absent; common *Psora tuckermanii*
- 9b Apothecia at most weakly convex(←); gyrophoric acid present; apparently rare *Psora montana*
- 8b Apothecia dark brown to black; upper surface generally dark brownish 10
- 10a Lobes distinctly white-pruinose along margins(←); lower surface white in the vicinity of the margins *Psora himalayana*
- 10b Lobes not or only faintly white-pruinose along margins (but occasionally pruinose on upper surface, especially near margins); lower surface brownish 11
- 11a Apothecia usually only weakly convex at maturity; lobes generally averaging to less than 1 mm wide; upper surface often distinctly pruinose, not at all fissured; medulla KC+ reddish or KC-, containing gyrophoric acid; semi-arid localities *Psora montana* (see lead 9b)



11b Apothecia strongly convex(←) (often hemispherical) at maturity; lobes averaging to more than 1 mm wide; upper surface at most weakly pruinose, often distinctly fissured; medulla KC-, lacking gyrophoric acid; distribution various ...
..... 12

12a Upper surface with shiny “waxen” appearance, especially near margins, usually dark reddish brown..... *Psora globifera* (including *Psora luridella*)

12b Upper surface less shiny, creamy brown to medium brown (rarely dark)
..... *Psora tuckermanii* (see lead **9a**)

***Psora cerebriformis* W. Weber**

Map 97

Fissured scale

Habitat/Range: Infrequent over base-rich soil in open intermontane grassland (BG zone); western N Am, N to AK, S to CA and NM.

Reactions: All spot tests negative.

Contents: Atranorin (norstictic acid).

***Psora decipiens* (Hedwig) Hoffm.**

(Syn. *Lecidea decipiens* (Hedwig) Ach.)

Sockeye scale (white-edged scale)

Habitat/Range: Frequent over base-rich soil in open inland sites, especially in semi-arid BG zone, but also occasionally in alpine; circumpolar, S to MX.

Reactions: All spot tests negative.

Contents: (Norstictic acid.)

***Psora globifera* (Ach.) Massal.**

(Syn. *Lecidea globifera* Ach.)

Blackberry scale

Habitat/Range: Common over base-rich rock, infrequent over soil in open inland sites, especially in semi-arid BG zone; N Am – western Eurasia, N to YU, S to CA, NM.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Notes: Most, if not all, of the B.C. material previously identified as *P. luridella* can be referred to *P. globifera*. A few recent specimens were tentatively assigned to *P. luridella* by E. Timdal who observes, however, that the distinction between these two species is not always clear. The lobes in *P. globifera* should be thicker, more fissured and less closely appressed than those in *P. luridella*. These characters, however, are doubtless subject to considerable environmental modification, leaving open the question whether *P. luridella* really does occur in B.C.

***Psora himalayana* (Church. Bab.) Timdal**

Mountain scale

Habitat/Range: Frequent over base-rich soil and rock in open inland sites throughout; western N Am – eastern Eurasia, N to AK, YU, S to AR and CO.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Notes: Sterile material can be difficult to separate from nonfruiting specimens of *Acarospora glaucocarpa*. In *Psora* the algal layer is continuous, whereas in *A. glaucocarpa* the algae are organized in discrete clumps.

***Psora montana* Timdal**

Map 98

Brown-eyed scale

Habitat/Range: Rare (overlooked?) over base-rich soil (including thin soil over rock) in open semi-arid and dry intermontane localities at lower elevations; western N Am, N to BC, S to UT.

Reactions: Medulla C+ reddish or C-, KC+ reddish or KC-.

Contents: Gyrophoric acid.

Notes: The identity of the B.C. material is problematic: according to E. Timdal (Oslo, pers. comm., 1992), it is morphologically similar to *P. pacifica* Timdal (i.e., with ascendant lobes), but is chemically closer to *P. montana*.

Psora nipponica (Zahlbr.) G. Schneider

(Syn. *Lecidea novomexicana* (B. de Lesd.) W. Weber ex R. Anderson; *Psora novomexicana* B. de Lesd.)

Butterfly scale

Habitat/Range: Frequent over acid or base-rich soil and rock in open maritime and intermontane sites; western N Am – eastern Eurasia, N to AK, S to CA.

Reactions: Lower surface C+ rose or C-.

Contents: Gyrophoric acid and lecanoric acid.

Psora rubiformis (Ach.) Hook.

Map 99

(Syn. *Lecidea rubiformis* (Ach.) Wahlenb.)

Butterfly scale

Habitat/Range: Rare over base-rich soil (especially thin soil over rock) at alpine elevations in northern intermontane localities; western N Am – eastern N Am – western Eurasia, N to AK, S to CO.

Reactions: Cortex KC+ yellow (or apparently KC-); medulla KC+ reddish or KC-.

Contents: Usnic acid (and gyrophoric acid).

Notes: Earlier reports of *P. rubiformis* from B.C. appear to belong to the more widespread *P. nipponica*. The only authentic specimens known to us were recently collected in the Tatshenshini Valley.

Psora tuckermanii R. Anderson ex Timdal

Brown-eyed scale

Habitat/Range: Frequent over base-rich soil and rock in open lowland sites in dry intermontane (BG, PP, IDF zones); western N Am, S to CA and NM.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Notes: *Psora tuckermanii* occasionally bears blackish apothecia and may be difficult to distinguish from *P. globifera*. Such forms, however, are not known to occur in B.C.

PSOROMA

Psoroma Ach. ex Michaux

The Mouse Lichens

Small to medium stratified squamulose lichens (ours), corticate above and below, nonsorediate, nonisidiate, cephalodia external, squamules closely to rather loosely appressed, averaging to 0.2–0.5 mm wide (ours). Upper surface usually **brownish**, smooth. Lower surface pale and resting on a pale hypothallus, lacking rhizines. Medulla white. **Photobiont green**, except with secondary blue-green cephalodia.

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

Over rock, soil and trees.

References: Jørgensen (1978); Henssen and Renner (1981).

Common Name: Reflects the resemblance of the species to “mouse” lichens of the genus *Pannaria*.

Notes: *Psoroma*, with approximately 35 species worldwide, is primarily a temperate genus of the southern hemisphere. Two species are reported for North America and only one of these occurs in B.C. A second species is not conclusively identified. *Psoroma* is closely related to *Pannaria*, but contains a green algal photobiont. The taxonomic distinctness of these two genera is in question.



1a
(x6)



1b
(x15)

1a Upper surface orangish brown; hypothallus pale; apothecia frequent(←); widespread **Psoroma hypnorum**

1b Upper surface dark olive-green; apothecia unknown in B.C. material; northern; alpine **Psoroma** sp. 1

Psoroma hypnorum (Vahl) S. Gray

Green mouse (scurf lichen)

Habitat/Range: Frequent over moist soil or rock in open or sheltered sites throughout; circumpolar, S to NM.

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

Contents: No lichen substances reported.

Notes: Cephalodia are occasionally present in this species. These are similar in form to the lobes, but are dark and contain a blue-green cyanobacterium.

Psoroma sp. 1

Map 100

Olive mouse

Habitat/Range: Rare over exposed acid outcrops in northern intermontane alpine localities; global range unknown.

Reactions: All spot tests negative.

Contents: No data available.

Notes: Included on the basis of a single specimen from the Tatshenshini Valley. The material, though scanty, is distinctive, consisting of small, semi-erect, densely overlapping squamules that average to 0.3–0.7 mm wide, and are intermingled with sparse, convoluted, dark brown cephalodia to 1 mm across. The lower surface is pale and supports a few cottony rhizines, though much of the surface is obscured by a thick, dark hypothallus. Though not closely matching Henssen and Renner's description (1981) of *P. tenue* Henssen var. *borealis* Henssen, the B.C. material may possibly be a shade form of that species. Further studies are in progress.

PUNCTELIA

Punctelia Krog

The Speckleback Lichens

Small to medium stratified foliose lichens, corticate above and below, **sorediate** (ours), lobes loosely appressed, elongate, averaging to 2–10 mm wide, thin to somewhat thick. Upper surface **pale greyish to pale greenish, K+ yellow, bearing small, rounded pseudocyphellae**. Lower surface pale or dark, shiny, bearing short, simple rhizines. Medulla white. Photobiont green.

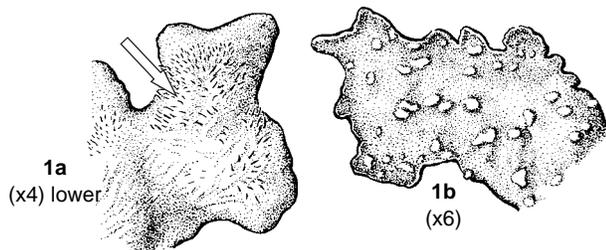
Apothecia unknown in the B.C. material.

Over rock and trees.

References: Hale (1965a); Krog (1982).

Common Name: Suggested by the presence of pale, speckle-like pseudocyphellae over the upper surface.

Notes: *Punctelia* is essentially a temperate and subtropical genus of approximately 18 species worldwide. Eleven of these occur in North America and two in B.C. For points of distinction with similar species in other genera, see the key under *Platismatia*.



1a Lower surface and rhizines pale tan to brown throughout(←); over rock and trees ***Punctelia subrudecta***

1b Lower surface and rhizines blackening; over rock ***Punctelia stictica***

Punctelia stictica (Duby) Krog

Map 101

(Syn. *Parmelia stictica* (Duby) Nyl.)

Seaside speckleback

Habitat/Range: Frequent over rock in open coastal outcrops at lower elevations, especially near the ocean; western N Am – eastern N Am – western Eurasia.

Reactions: Cortex K+ yellow; medulla C+ reddish, KC+ reddish.

Contents: Atranorin, gyrophoric acid.

Punctelia subrudecta (Nyl.) Krog

Map 102

(Syn. *Parmelia subrudecta* Nyl.)

Forest speckleback

Habitat/Range: Infrequent over rock, trees and shrubs in open maritime forests (CDF zone) at lower elevations; incompletely circumpolar, N to BC, S to CA.

Reactions: Cortex K+ yellow; medulla C+ reddish, KC+ reddish.

Contents: Atranorin, lecanoric acid.

RHIZOPLACA

Rhizoplaca Zopf

The Rockbright Lichens

Small stratified foliose lichens (ours), **umbilicate**, rotund, corticate above and below, nonsorediate, nonisidiate, lobes poorly developed, entire thallus averaging to 1–2 cm across, thin to thick. Upper surface **whitish or pale greenish**. Lower surface pale, brownish or blue-black, **lacking rhizines**. Medulla white. Photobiont green.

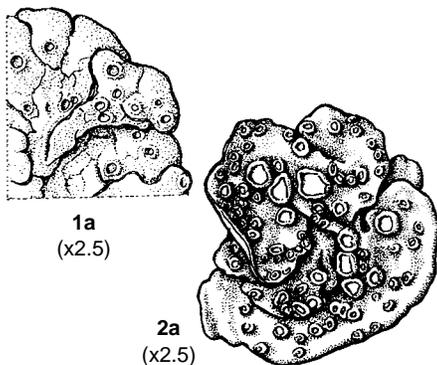
Apothecia located over upper surface, **usually numerous**, disc even, pinkish or brownish to greenish or blackish; spores simple, ellipsoid, colourless, 8 per ascus.

Over acid or base-rich rock.

References: Leuckert et al. (1977); McCune (1987).

Common Name: Describes the habitat and brightly coloured upper surface of the species.

Notes: *Rhizoplaca* is primarily a genus of temperate latitudes where it is best represented in semi-arid regions. Of the six species reported for North America, only three occur in B.C.



1a Lower surface cracked, cracks generally assuming distinct netlike pattern (check larger thalli); apothecial margins lacking white pruina, discs greenish or more often brownish; medulla PD+ orange (rarely PD+ yellow)

..... ***Rhizoplaca peltata***

1b Lower surface continuous or, if cracked, then cracks radial (i.e., never forming distinct netlike pattern); apothecial margins often pruinose, discs pinkish orange, greenish, brownish, or rarely black; medulla PD+ yellow or PD-

2a Apothecial discs at least in part pale or bright orangish or pinkish orange

..... ***Rhizoplaca chrysoleuca***

2b Apothecial discs pale greenish to olive-brownish or black

..... ***Rhizoplaca melanophthalma***

***Rhizoplaca chrysoleuca* (Sm.) Zopf**

(Syn. *Lecanora chrysoleuca* (Sm.) Ach.; *L. rubina* (Vill.) Ach.)

Pink-eyed rockbright

Habitat/Range: Frequent over acid or base-rich rock in open to exposed inland sites, especially in arid or dry climates; circumpolar, S to MX.

Reactions: Medulla PD- or rarely PD+ yellow.

Contents: Usnic, (placodiolic, pseudoplacodiolic and psoromic acids).

***Rhizoplaca melanophthalma* (DC. in Lam. & DC.) Leuck. & Poelt**

(Syn. *Lecanora melanophthalma* (DC. in Lam. & DC.) Ramond)

Black-eyed rockbright

Habitat/Range: Frequent over acid or (occasionally) base-rich rock in open to exposed inland sites, especially in arid or dry climates; circumpolar, S to MX.

Reactions: Medulla PD+ yellow or PD-.

Contents: Usnic, (placodiolic and psoromic acids).

Notes: Some of the B.C. specimens seem to be intermediate between *R. melanophthalma* and *Lecanora muralis* (Schreber) Rabenh.; these possibly represent a distinct taxon.

Rhizoplaca peltata (Ramond) Leuck. & Poelt

Map 103

(Syn. *Lecanora peltata* (Ramond) Steudel)

Brown-eyed rockbright

Habitat/Range: Infrequent over base-rich rock in open to exposed, arid intermontane localities, especially the BG zone; western N Am – western Eurasia – eastern Eurasia, S to AZ.

Reactions: Medulla PD+ orange (rarely PD+ yellow or PD-).

Contents: Pannarin, usnic acid, zeorin (and psoromic acid).

SOLORINA**Solorina Ach.****The Owl Lichens**

Small to medium (rarely minute) **stratified foliose lichens**, corticate above and below, nonsorediate, nonisidiate, bearing cephalodia, lobes closely appressed to more often **loosely appressed**, short to subrotund, averaging to 0.5–3 (–10) mm wide, thin. Upper surface **pale greenish** or occasionally orangish brown, shiny or dull. Lower surface white or, in one species, orange, dull, usually weakly **veined**, often bearing scattered rhizines. Medulla white (orange in one species). **Photobiont green and blue-green**.

Apothecia **immersed in upper surface, disc reddish brown**; spores 2-celled, ellipsoid, brown, 2–8 per ascus.**Over soil and mosses over soil**, usually base-rich sites.

References: Thomson (1984); Thomson and Thomson (1984).

Common Name: Alludes to the typically round, large apothecia, which are usually somewhat sunken below the average level of the upper surface.

Notes: *Solorina* is a boreal–arctic genus consisting of about ten species worldwide. Five species are reported for North America and all occur in B.C. Spot tests are of little taxonomic value in this genus and have therefore been omitted in the following accounts. For points of distinction with similar lichens, see the key under *Peltigera*.

-
- 1a** Medulla bright orange; over acid or base-rich soil in snowy localities; alpine and subalpine ***Solorina crocea***
- 1b** Medulla white; over base-rich soil; distribution various 2
- 2a** Thallus more or less well developed, at maturity generally more than 1.0 cm wide; upper surface never pruinose, usually continuous; apothecia weakly to sometimes deeply sunken 3
- 3a** Upper surface predominantly pale greenish; thallus usually more or less rounded in outline, not lobate; spores 4 per ascus; widespread ***Solorina saccata***
- 3b** Upper surface predominantly brownish; thallus lobate, lobes short or elongate (i.e., thallus not rounded in outline); spores 8 per ascus; alpine ***Solorina octospora***
- 2b** Thallus often poorly developed, often less than 1.0 cm wide at maturity; upper surface often white-pruinose, chinky-cracked when mature; apothecia deeply sunken 4
- 4a** Thallus minute, often consisting primarily of granular cephalodia that form supporting “cushion” around apothecia(←); spores 4 per ascus ***Solorina spongiosa***
- 4b** Thallus larger, conspicuous; apothecia not associated with cephalodia; spores 2 per ascus ***Solorina bispora***

***Solorina bispora* Nyl.**

Map 104

Tundra owl

Habitat/Range: Rare over base-rich soil and rock in exposed inland alpine localities; circumpolar, S to NM.

***Solorina crocea* (L.) Ach.**

Chocolate chip (saffron-yellow solorina)

Habitat/Range: Frequent over acid and base-rich soil in seepage sites below late-lying snow patches at alpine and subalpine elevations throughout, except possibly absent from hypermaritime localities; circumpolar, S to NM.

Solorina octospora (Arnold) Arnold

Map 105

Tundra owl

Habitat/Range: Infrequent over base-rich soil and rock in exposed inland alpine localities; probably circumpolar, S to NM.

Solorina saccata (L.) Ach.

Woodland owl (dimpled lichen)

Habitat/Range: Infrequent over moist base-rich soil, moss and rock in open to somewhat shady localities throughout, except rare in maritime sites and probably absent from the arid intermontane; circumpolar, S to OR.

Notes: Cephalodia are occasionally developed over the upper surface in the B.C. material.

Solorina spongiosa (Ach.) Anzi

Map 106

Fringed owl

Habitat/Range: Rare over moist base-rich soil and moss in exposed intermontane and especially boreal alpine localities; probably circumpolar, S to NM.

STICTA

Sticta (Schreber) Ach.

The Moon Lichens

Small to medium **stratified foliose lichens**, corticate above and below, sorediate or isidiate or not, lobes **loosely attached** to semi-erect, elongate to more often rotund, averaging to 1–2 cm wide, often single-lobed or few-lobed. Upper surface usually dark brownish, greyish brown or nearly black, rarely pale green. Lower surface pale or dark, naked or more often bearing minute woolly hairs, and **bearing cyphellae**. Medulla white (ours). Photobiont blue-green or green.

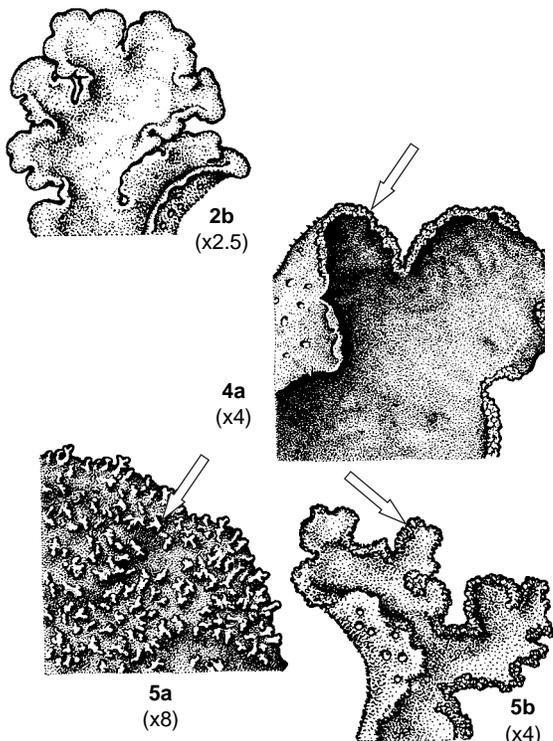
Apothecia not seen in the B.C. material.

Over bark, rarely also over mossy rock.

Reference: Galloway (1985).

Common Name: Suggested by the presence of numerous tiny, sunken cyphellae (“craters”) over the lower surface.

Notes: *Sticta*, with about 200 species worldwide, is primarily a tropical and temperate genus of the southern hemisphere. Only eight species are reported for North America and five have been documented in B.C.



- 1a Photobiont a green alga; upper surface pale green; rare 2
- 2a Growing attached to *Dendroscopula intricatum* (Nyl.) Henssen (i.e., a small, black, shrubby lichen); upper cortex K+ yellow *Sticta* sp. 1
- 2b Not growing attached to *D. intricatum*; upper cortex K- *Sticta wrightii*
- 1b Photobiont a dark blue-green cyanobacterium; upper surface dark or at least never pale green; status various 3
- 3a Isidia and soredia absent; over mosses and mossy rocks in alpine zone [*Sticta arctica*]
- 3b Isidia or soredia present; over trees or mossy rocks at lower elevations 4
- 4a Thallus sorediate (except older soredia sometimes somewhat isidiate), soredia essentially restricted to lobe margins(←) *Sticta limbata*
- 4b Thallus isidiate from the first, isidia variously distributed 5
- 5a Isidia more or less scattered over upper surface(←) *Sticta fuliginosa*
- 5b Isidia clustered along lobe margins(←) (also occasionally in clusters over upper surface) *Sticta weigeli*