[*Sticta arctica* Degel.]

Arctic moon

Habitat/Range: Over mosses and mossy rocks in alpine localities; N Am – eastern Eurasia, N to AK, S to OR.

Reaction: All spot tests negative.

Contents: No lichen substances reported.

Notes: Not recorded from B.C., but known to occur in southern coastal Alaska only a few kilometres from the B.C. border.

Sticta fuliginosa (**Hoffm.**) **Ach.**

Peppered moon (sooty leather lichen)

Habitat/Range: Frequent over deciduous trees and conifers, also over mossy rock, in humid forests at lower elevations throughout, except absent from boreal regions; incompletely circumpolar, N to AK, S to CA.

Reaction: All spot tests negative.

Contents: No lichen substances reported.

Sticta limbata (**Sm.**) **Ach.**

Powdered moon

Habitat/Range: Infrequent over deciduous trees and especially mossy rock in open coastal forests at lower elevations, also rare in intermontane (ICH zone); western N Am – eastern N Am – western Eurasia, N to AK, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Sticta weigelii (**Ach.**) **Vainio** Map 107

Fringed moon (Weigel's leather lichen)

Habitat/Range: Rare over trees and shrubs in open coastal forests at lower elevations; western N Am – eastern N Am – eastern Eurasia, N to AK, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

Sticta wrightii **Tuck.** Map 108

Green moon

Habitat/Range: Rare over conifers in semi-shady intermontane old-growth forests at lower elevations; western N Am – eastern Eurasia, N to AK, S to BC.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

***Sticta* sp. 1** Map 109

Green moon

Habitat/Range: Rare over conifer branches and mossy logs in humid intermontane forests at lower elevations; global distribution unknown.

Reactions: Cortex K+ yellow.

Contents: No data available.

Notes: *Sticta* sp. 1 is the blue-green phototype of *Dendriscocaulon intricatulum* (Nyl.) Henssen.

UMBILICARIA

Umbilicaria **Hoffm.** **The Rocktripe Lichens**

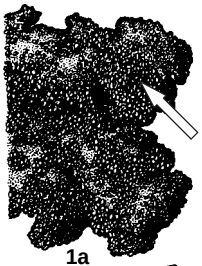
Small to ***medium stratified foliose lichens***, ***umbilicate***, rotund to subrotund, corticate above and below, isidiate or more often not, thalloconidiate or not, lobes developed or not, thallus averaging to 0.5–7 (–15+) cm across, thin or occasionally thick. Upper surface ***greyish to dark brown***. Lower surface tan, brown or black, naked or more or less covered in rhizines, plates and/or papillae. Medulla white. Photobiont green.

Apothecia located over upper surface, ***disc even or variously fissured or with central protruding button***, black; spores simple or multi-celled, ellipsoid, colourless or occasionally brown, (1–) 8 per ascus.

References: Llano (1950); Imshaug (1957); Thomson (1984); Hestmark (1990); Wei and Biazrov (1991).

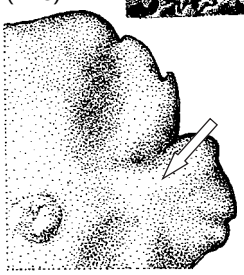
Common Name: Traditional, reflecting both the strict occurrence of the species over rock and (apparently) the use of certain species as food in times of famine.

Notes: *Umbilicaria* is primarily a boreal and arctic genus consisting of approximately 45 species worldwide. Of the 28 species known to occur in North America, 20 are reported for B.C. Earlier authors arranged the species listed below in as many as four genera — *Actinogyra*, *Agyrophora*, *Omphalodiscus* and *Umbilicaria* — though it is now customary to accommodate them in *Umbilicaria*. Strongly pustulate species, however, should be checked for in *Lasallia*. Gyrophoric acid (C+ red) is present in most *Umbilicaria* species, and norstictic and stictic acids also occur on occasion. Chemistry, however, is of little diagnostic value in this genus and is omitted in the following accounts.



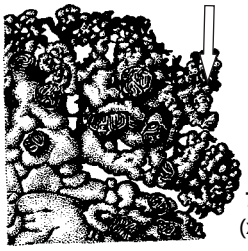
1a (x8)

2a (x4)

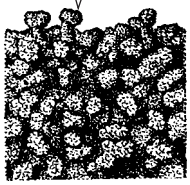


5a (x.75)

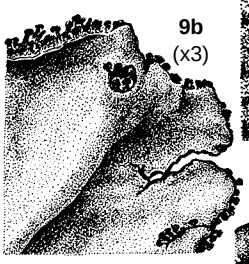
7a (x2.5)



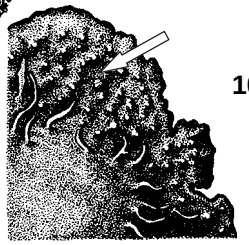
7b (x4)



8a, 9a (x8) lower



9b (x3)



10a (x4) lower

1a Minute isidia present over upper surface(←); lower surface naked, often weakly pitted .... ***Umbilicaria deusta***

1b Isidia absent; lower surface naked or bearing plates or rhizines, pitted or not 2

2a Thallus apparently crustose: closely and broadly attached to substrate; upper surface chinky-cracked (i.e., divided into numerous polygonal plates); inland in exposed alpine sites ..... ***Umbilicaria lambii***

2b Thallus distinctly foliose, attached to substrate by single, more or less central holdfast; upper surface occasionally perforate or segmented, but never chinky-cracked; distribution and ecology various 3

3a Lower surface (excluding rhizines) jet black throughout or partly covered in sharply demarcated, black, sooty patches (i.e., thalloconidia present or apparently present) (Note: all specimens having ball-tipped rhizines key here) 4

4a Lower surface (or sometimes lobe margins) bearing numerous rhizines and/or plate-like outgrowths 5

5a Upper surface very strongly white-pruinose(←); pale cream to occasionally greyish white ..... ***Umbilicaria vellea***

5b Upper surface at most moderate pruinose; greyish, brownish or blackish 6

6a Upper surface abundantly perforate (check near lobe margins) and/or bearing scattered tufts of rhizines 7

7a Upper surface ridged and white-pruinose over thallus centre, also generally sparsely rhizinate(←); lower surface partly sooty black (i.e., thalloconidia present); apothecia rare; alpine ..... ***Umbilicaria havaasii***

7b Upper surface more or less segmented(←), but never distinctly ridged, white-pruinose or rhizinate; lower surface pale to dark, but never sooty black (i.e., thalloconidia absent); apothecia common; widespread .... ***Umbilicaria torrefacta***

6b Upper surface lacking perforations or only sparsely perforate; upper surface lacking rhizines (Note: all specimens having ball-tipped rhizines key here) 8

8a Rhizines in part distinctly ball-tipped(←) 9

9a Lower surface bearing horizontal, platelike outgrowths (check toward thallus centre); alpine; northern; rare ..... ***Umbilicaria cinereorufescens***

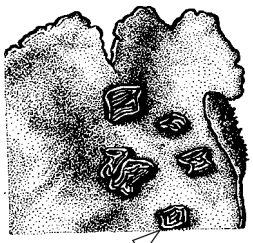
9b Lower surface strictly rhizinate, lacking platelike outgrowths; lowland; coastal; frequent ..... ***Umbilicaria polyrrhiza***

8b Rhizines not at all ball-tipped 10

10a Lower surface with sharply demarcated black sooty patches/ thalloconidia(←); rhizines sparse; apothecia rare; alpine; northern; rare..... ..... ***Umbilicaria aprina***

10b Lower surface more or less dark, but without sharply demarcated sooty patches; rhizines abundant; apothecia usually abundant; ecology and distribution various; frequent or infrequent 11

11a (x1.5) lower



11b (x4)

11a Lower surface generally brownish toward thallus periphery; "rhizines" distinctly grainy textured (graininess visible with hand lens), oriented more or less parallel to lower surface and forming interwoven network(←) over it; apothecia generally rounded in outline ..... ***Umbilicaria muehlenbergii***

11b Lower surface (excluding rhizines) generally black throughout, rhizines more or less discrete or at least not distinctly netlike; graininess detectable or not over lower surface itself, but rhizines not at all grainy; apothecia generally angular(←) in outline ..... ***Umbilicaria angulata***

4b Lower surface sometimes minutely textured, but lacking rhizines and plates or bearing a few scattered cylindrical rhizines; lobe margins never rhizinate 12

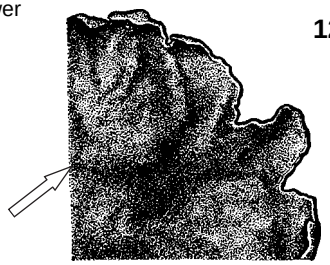
12a Upper surface more or less smooth, sometimes bearing sparse rhizines 13

13a Upper surface generally sparsely rhizinate; lower surface pale toward thallus centre and at margins, black, sooty thalloconidia usually confined to portions in between ..... ***Umbilicaria havaasii*** (see lead **7a**)

13b Upper surface never bearing rhizines; lower surface black almost throughout(←) 14

14a Apothecia absent or at most sparse; upper surface often weakly lobulate ... . ***Umbilicaria polyphylla***

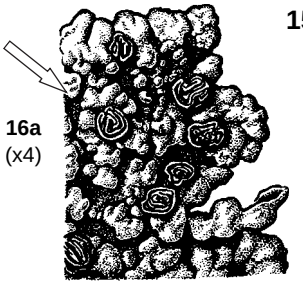
14b Apothecia usually abundant; upper surface never lobulate .... ***Umbilicaria hyperborea*** (see lead **16a**)



13b, 14a (x4) lower

12b Upper surface distinctly ridged, pustulate or grainy textured rhizines absent 15

15a Upper surface smooth or pustulate-ridged, more or less uniformly brown (occasionally blackish brown) throughout; white pruina absent or at most weakly developed over thallus centre 16



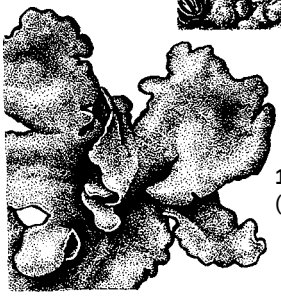
16a (x4)

16a Lower surface not distinctly sooty black, generally somewhat shiny (i.e., thalloconidia absent); upper surface usually pustulate-ridged(←); apothecia common ..... ***Umbilicaria hyperborea***

16b Lower surface dull sooty black almost throughout (i.e., thalloconidia present); upper surface plane to pustulate-ridged; apothecia rare 17

17a Upper surface more or less pustulate-ridged, not at all lobulate; thallus usually few-lobed ..... ***Umbilicaria nylanderiana***

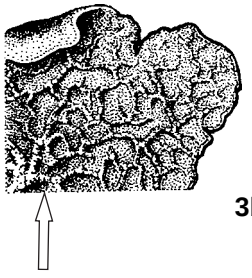
17b Upper surface more or less smooth, often sparsely lobulate; thallus many-lobed ..... ***Umbilicaria polyphylla*** (see also lead **14a**)



17b (x4)

15b Upper surface net-ridged or grainy textured, usually dark greyish to blackish, except distinctly white-pruinose over thallus centre 18

18a Upper surface strongly net-ridged more or less throughout; thallus thick (300–600 μ), rigid; lower surface often with folds radiating from umbilicus; apothecial disc buttoned to apparently much-fissured (omphalodisc to apparently gyrodisc) ..... [***Umbilicaria decussata***]



18b (x2.5)

18b Upper surface generally net-ridged only toward thallus centre(←); thallus thinner, somewhat pliant; lower surface without folds radiating from umbilicus; apothecial disc smooth ..... ***Umbilicaria lyngei*** (see also lead **7a**)

3b Lower surface (excluding rhizines) pale or brown or, if partly grading to black, then thalloconidia absent (i.e., lacking sharply demarcated black, sooty patches); apothecia usually abundant 19

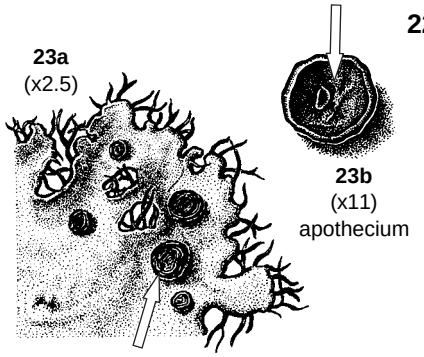
19a Lower surface (or sometimes lobe margins) bearing numerous rhizines and/or platelike outgrowths 20

20a Lower surface bearing platelike outgrowths, these often dissected, forming network of interwoven "rhizines" that may in part resemble true rhizines 21

21a Upper surface distinctly segmented and/or apparently composed of close-fitting lobes when mature; thallus margins also more or less densely and minutely perforate (as though with pinholes) ..... ***Umbilicaria torrefacta*** (see lead **7b**)

21b Upper surface occasionally cracked, but not at all distinctly segmented; thallus margins not perforate when mature ..... ***Umbilicaria muehlenbergii*** (see lead **11a**)

20b Lower surface and/or lobe margins more or less rhizinate; platelike outgrowths absent 22



23a (x2.5)

23b (x11) apothecium

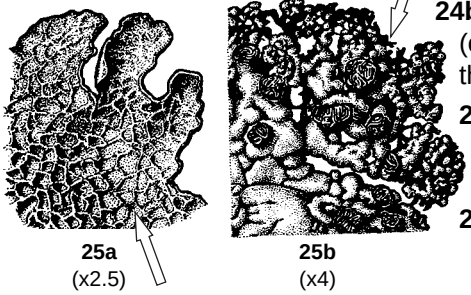
22a Upper surface pale, more or less strongly white-pruinose throughout; lower surface pale pinkish to pale brownish; apothecial discs smooth (leiodisc) or variously fissured; alpine 23

23a Lower surface pale tan to brownish; lobe margins generally at least in part rhizinate; apothecial discs much-fissured (gyrodisc)(←) ..... ***Umbilicaria cylindrica***

23b Lower surface pinkish; lobe margins rarely rhizinate (though often appearing so owing to the projection of the rhizines of lower surface beyond thallus periphery); apothecial discs smooth or at most buttoned (omphalodisc)(←) ..... ***Umbilicaria virginis***

22b Upper surface dark, never strongly white-pruinose throughout (pruina, however, sometimes distinct over thallus centre); lower surface pale greyish; apothecial discs much-fissured; distribution various 24

24a Upper surface generally weakly pustulate and/or pustulate-ridged throughout, net-ridged or partly segmented; peripheral portions of thallus continuous, never minutely perforate ..... ***Umbilicaria hyperborea*** var. ***radicicula*** (see lead **16a**)



25a (x2.5)

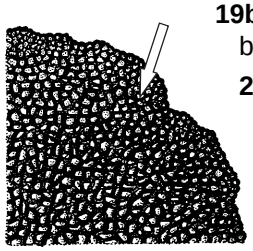
25b (x4)

24b Upper surface either in part net-ridged (check thallus centre) or segmented (check thallus periphery), rest of thallus pustulate or not; peripheral portions of thallus sometimes minutely perforate 25

25a Upper surface generally net-ridged/reticulate(←) and/or white-pruinose over thallus centre; thallus periphery continuous (i.e., neither segmented nor minutely perforate) ..... ***Umbilicaria proboscidea***

25b Upper surface neither net-ridged nor distinctly white-pruinose; thallus periphery generally distinctly segmented and minutely perforate(←) ..... ***Umbilicaria torrefacta***

19b Lower surface sometimes minutely textured, lacking rhizines and plates or at most bearing a few scattered cylindrical rhizines; lobe margins never rhizinate 26



27a (x8)

26a Lower surface distinctly and evenly grainy textured throughout, graininess readily observed with hand lens 27

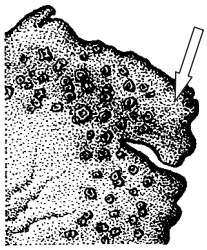
27a Upper surface distinctly and more or less evenly grainy textured throughout(←), generally also distinctly white-pruinose over thallus centre; apothecial discs smooth or at most buttoned; alpine ..... ***Umbilicaria rigida***

27b Upper surface plane to pustulate-ridged or apparently chinky, never distinctly grainy textured, never white-pruinose; apothecia much-fissured; distribution various 28

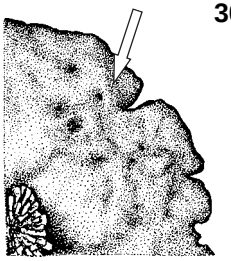
28a Thallus periphery abundantly and minutely perforate ..... ***Umbilicaria torrefacta*** (see lead **25b**)

28b Thallus periphery never abundantly and minutely perforate 29

29a Upper surface more or less blistered/pustulate-ridged; thallus generally irregular in outline ..... ***Umbilicaria hyperborea*** (see lead **16a**)



29b
(x2.5)



31b
(x4) lower

29b Upper surface smooth(←) or apparently chinky, never distinctly pustulate; thallus generally somewhat round in outline ..... ***Umbilicaria phaea***

26b Lower surface smooth or at most irregularly and minutely grainy, graininess difficult or impossible to detect with hand lens 30

30a Upper surface usually pustulate-ridged throughout, spaces between pustules often in part darker than pustules themselves; location of holdfast not readily discernable from above; apothecial discs much-fissured .... ***Umbilicaria hyperborea*** (see lead **16a**)

30b Upper surface pustulate-ridged or not, but generally also in part distinctly net-ridged and/or white-pruinose (check central portions); position of holdfast usually readily discernable from above; apothecial discs much-fissured or not 31

31a Lower surface white-pruinose throughout, smooth to minutely textured; thallus distinctly thick; apothecial disc smooth or at most buttoned; inland .... ***Umbilicaria krascheninnikovii***

31b Lower surface white-pruinose usually only toward thallus margins(←); thallus not at all distinctly thick; apothecial disc much-fissured; widespread .... ***Umbilicaria proboscidea***

***Umbilicaria angulata* Tuck.**
(Syn. *Gyrophora angulata* (Tuck.) Herre)
Asterisk rocktripe
Habitat/Range: Frequent over acid rock in exposed outcrop sites throughout, except apparently absent from boreal regions; western N Am – eastern Eurasia, N to AK, S to CA.

***Umbilicaria aprina* Nyl.** Map 110
Ashen rocktripe
Habitat/Range: Rare over acid rock in open boulderbeds at alpine elevations in boreal regions; western N Am – eastern N Am – western Eurasia.
Notes: The single B.C. specimen, from Summit Lake, bears a narrow band of sparse rhizines near the thallus margin and thus belongs in var. *halei* Llano (Goward et al. 1994a).

***Umbilicaria cinereorufescens* (Schaerer) Frey** Map 111
Doubtful rocktripe
Habitat/Range: Rare over acid rock in open, northern, inland alpine outcrops; western N Am – eastern N Am – western Eurasia, N to AK, S to AZ.
Notes: This species can be difficult to distinguish from (the more copiously pruinose) *U. vellea* (Goward et al. 1994a).

***Umbilicaria cylindrica* (L.) Delise *ex* Duby**
(Syn. *Gyrophora cylindrica* (L.) Ach.)
Fringed rocktripe
Habitat/Range: Frequent over acid rock in exposed subalpine and alpine localities throughout; circumpolar, S to CO.

[*Umbilicaria decussata* (Vill.) Zahlbr.]
(Syn. *Gyrophora decussata* (Vill.) Zahlbr.; *Omphalodiscus decussatus* (Vill.) Schol.)
Netted rocktripe
Habitat/Range: Over vertical rock in exposed alpine localities; circumpolar, N to AK, S to MX.
Notes: Not reliably reported for B.C.; see notes under “Excluded Species.”

***Umbilicaria deusta* (L.) Baumg.**
(Syn. *Gyrophora deusta* (L.) Ach.)
Peppered rocktripe
Habitat/Range: Common over acid rock (especially in water channels) in open to somewhat sheltered sites throughout; circumpolar, S to AZ.

***Umbilicaria havaasii* Llano**
Ragged rocktripe
Habitat/Range: Frequent over vertical acid rock in exposed alpine localities throughout, also rare in similar sites at lower elevations; western N Am – eastern N Am – western Eurasia, S to WA.

***Umbilicaria hyperborea* (Ach.) Hoffm.**
(Syn. *Gyrophora hyperborea* Ach.)
Blistered rocktripe (northern rocktripe)
Habitat/Range: Common over acid rock in open to exposed localities throughout, though perhaps absent from hypermaritime districts; circumpolar, S to MX.
Notes: Two varieties are known to occur in B.C.:

1a Lower surface bearing rhizines; very rare ..... var. ***radicicula* (Zetterst.) Hasselrot**
1b Lower surface naked; common ..... var. ***hyperborea***

***Umbilicaria krascheninnikovii* (Savicz) Zahlbr.** Map 112
(Syn. *Omphalodiscus krascheninnikovii* (Savicz) Schol.
Netted rocktripe
Habitat/Range: Infrequent over acid rock in exposed, inland alpine localities; circumpolar, S to AZ and CA.

***Umbilicaria lambii* Imsh.** Map 113
Windward rocktripe
Habitat/Range: Infrequent over vertical acid rock in exposed inland alpine sites; western N Am, S to WA.
Notes: The type locality is at Sunburst Lake, in Mt. Assiniboine Provincial Park, B.C.

***Umbilicaria lyngei* Schol.** Map 114
(Syn. *Agyrophora lyngei* (Schol.) Llano)
Netted rocktripe
Habitat/Range: Infrequent over acid rock in exposed inland alpine sites; circumpolar, S to OR.

***Umbilicaria muehlenbergii* (Ach.) Tuck.** Map 115
(Syn. *Actinogyra muehlenbergii* (Ach.) Schol.; *Gyrophora muehlenbergii* Ach.)
Plated rocktripe (Muhlenberg's rocktripe)
Habitat/Range: Infrequent over acid rock in open intermontane and especially boreal localities; western N Am – eastern N Am – eastern Eurasia.

***Umbilicaria nylanderiana* (Zahlbr.) Magnusson** Map 116
Blistered rocktripe
Habitat/Range: Rare over acid rock in boreal alpine localities; western N Am – eastern N Am – western Eurasia, N to AK, S to CA.
Notes: The B.C. material intergrades with *U. polyphylla* and may be referred more appropriately to that species.

***Umbilicaria phaea* Tuck.**
(Syn. *Gyrophora phaea* (Tuck.) Nyl.)
Emery rocktripe
Habitat/Range: Frequent over rock in open sites at lower elevations, in semi-arid to dry intermontane localities, less common in maritime sites and probably absent from hypermaritime localities; western N Am – eastern Eurasia, N to AK, S to MX.

***Umbilicaria polyphylla* (L.) Baumg.**
(Syn. *Gyrophora polyphylla* (L.) Fink)
Petalled rocktripe (black rocktripe)
Habitat/Range: Frequent over acid rock in open sites throughout, except probably absent from hypermaritime localities; circumpolar, S to CA.

***Umbilicaria polyrrhiza* (L.) Fr.** Map 117

(Syn. *Actinogyra polyrrhiza* (L.) Schol.; *Gyrophora polyrrhiza* (L.) Körber)

Ballpoint rocktripe

Habitat/Range: Frequent over acid rock in open coastal localities at lower elevations; western N Am – eastern N Am – western Eurasia, S to CA.

***Umbilicaria proboscidea* (L.) Schrader**

Netted rocktripe (beaked rocktripe)

Habitat/Range: Frequent over acid rock in exposed to somewhat sheltered sites throughout, especially in alpine localities; circumpolar, S to OR.

Notes: Specimens from coastal localities often lack the netlike ridges characteristic of this species.

***Umbilicaria rigida* (Du Rietz) Frey** Map 118

(Syn. *Agyrophora rigida* (Du Rietz) Llano; *Gyrophora anthracina* (Wulfen) Körber, *Umbilicaria coriacea* Imsh.)

Roughened rocktripe

Habitat/Range: Rare over acid rock in exposed boreal alpine localities; probably circumpolar, S to WA.

***Umbilicaria torrefacta* (Lightf.) Schrader**

(Syn. *Gyrophora erosa* (G. Weber) Ach.)

Punctured rocktripe

Habitat/Range: Common over acid or base-rich rock in open sites throughout; circumpolar, S to MX.

***Umbilicaria vellea* (L.) Ach.**

(Syn. *Gyrophora vellea* (L.) Ach.)

Frosted rocktripe (fleecy rocktripe)

Habitat/Range: Frequent over vertical acid rock in open or somewhat sheltered inland sites; circumpolar, S to MX.

***Umbilicaria virginis* Schaerer**

(Syn. *Omphalodiscus virginis* (Schaerer) Schol.)

Blushing rocktripe

Habitat/Range: Frequent over vertical acid rock in exposed inland alpine sites; circumpolar, S to MX.

VESTERGRENOPSIS

***Vestergrenopsis* Gyelnik** **The Brownette Lichens**

Small stratified foliose lichens, weakly corticate above and below, isidiate or not, lobes ***closely appressed***, ***elongate-linear***, averaging to 0.2–0.4 mm wide, thin. Upper surface ***dark olive-brown***, somewhat shiny, ***longitudinally striate*** or rarely smooth. Lower surface pale or dark, bearing scattered, short, simple rhizines. Medulla white. ***Photobiont blue-green***.

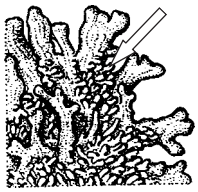
Apothecia located over upper surface, disc brownish, rim thalline, spores simple, ellipsoid, colourless, 12–16 per ascus.

Over rock.

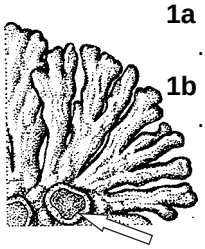
Reference: Henssen (1963c).

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

Notes: *Vestergrenopsis* is an arctic-boreal genus consisting of two species worldwide. Both of these occur in B.C. No lichen substances have been reported in this genus. For points of distinction with similar species, see the key under *Placynthium*.



1a (x11)



1b (x11)

1a Upper surface isidiate(←); apothecia rare; widespread ..... ***Vestergrenopsis isidiata***

1b Upper surface lacking isidia; apothecia common(←); northern ..... ***Vestergrenopsis elaeina***

Vestergrenopsis elaeina (**Wahl.**) **Gyelnik** Map 119

Eyed brownette

Habitat/Range: Infrequent over intermittently wetted acid rock in open to somewhat sheltered northern inland alpine localities; western N Am – western Eurasia, N to AK, S to BC.

Vestergrenopsis isidiata (**Degel.**) **E. Dahl** Map 120

Peppered brownette

Habitat/Range: Infrequent (possibly overlooked) over intermittently wetted acid rock in open to somewhat sheltered sites throughout, except possibly absent in lowland coastal localities; western N Am – eastern N Am – western Eurasia, S to BC.

VULPICIDA

Vulpicida **J.-E. Mattsson & Lai** **The Sunshine Lichens**

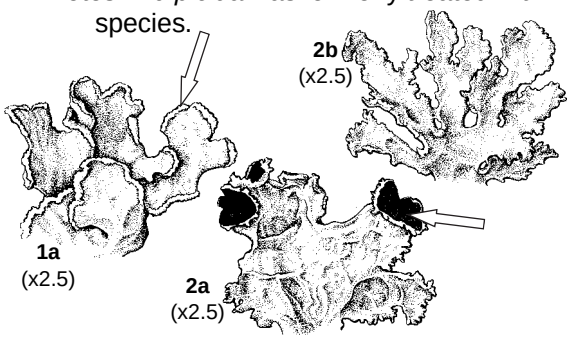
Medium stratified foliose lichens (ours), corticate above and below, sorediate or not, lobes loosely appressed to loosely attached, somewhat ***elongate***, averaging to ***2–7*** (***–10***) ***mm wide***, moderately thick, sometimes bearing ***protruberant marginal*** (or occasionally laminal) ***pycnidia***. Upper surface ***yellowish or yellowish green***; ***lower surface coloured alike with upper surface***, except dark toward central portions, sparse rhizines. ***Medulla yellow***. Photobiont green.

Apothecia located near lobe margins and over upper surface, disc brown; spores simple, more or less spherical, colourless, 8 per ascus.

References: Mattsson (1993); Mattsson and Lai (1993).

Common Name: Reflects the bright yellow coloration of the species.

Notes: *Vulpicida* was formerly treated within *Cetraria*; see the key to that genus for points of distinction with similar species.



1a Soredia present along lobe margins(←) ..... ***Vulpicida pinastri***

1b Soredia absent 2

2a Over bark; apothecia often present(←); at lower elevations .... ***Vulpicida canadensis***

2b Over calcium-rich ground; apothecia rare; subalpine and alpine ..... ***Vulpicida tilesii***

Vulpicida canadensis (**Räsänen**) **J.-E. Mattsson & Lai**

(Syn. *Cetraria canadensis* (Räsänen) Räsänen)

Brown-eyed sunshine

Habitat/Range: Common over conifers, infrequent over deciduous trees and shrubs, in open forests at lower elevations in coastal and intermontane regions, though absent in hypermaritime; western N Am, N to BC, S to CA.

Reactions: All spot tests negative.

Contents: Pinastric, usnic and vulpinic acids and an unknown fatty acid.

Vulpicida pinastri (**Scop.**) **J.-E. Mattsson & Lai**

(Syn. *Cetraria pinastri* (Scop.) S. Gray)

Powdered sunshine (moonshine cetraria, pine lichen)

Habitat/Range: Common over (bases of) conifers and deciduous trees and shrubs in open to somewhat shaded inland forests, also rare over acid rock; circumpolar, N to AK, YU, S to NM.

Reactions: All spot tests negative.

Contents: Pinastric, usnic and vulpinic acids.

Vulpicida tilesii **(Ach.) J.-E. Mattsson & Lai**

(Syn. *Cetraria tilesii* Ach.)

Limestone sunshine (yellow lichen)

Habitat/Range: Frequent over base-rich ground in open inland alpine and subalpine localities; circumpolar, N to AK, YU, S to NM.

Reactions: All spot tests negative.

Contents: Pinastric, usnic and vulpinic acids.

WAYNEA

Waynea **Moberg** **The Scale Lichens**

Minute stratified squamulose lichens, corticate above, noncorticate below, ***sorediate***, squamules ***attached to substrate mostly at one margin***, loosely attached at maturity, rotund to elongate, often lobulate, averaging to 0.5 mm wide, thin. Upper surface ***yellowish green or bluish green***, smooth. Lower surface pale, lacking rhizines. Medulla white. Photobiont green.

Apothecia located over upper surface, disc greyish or same colour as thallus; ***spores 4-celled***, somewhat spindle-shaped, colourless, 8 per ascus.

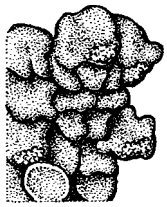
Over deciduous trees.

References: Moberg (1990); Roux and Clerc (1991).

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

Notes: *Waynea* is a temperate genus consisting of two species worldwide. Only one of these occurs in North America. For points of distinction with similar species, see the key under *Hypocenomyce*.

Waynea californica **Moberg** Map 121



(x15)

Knobbed scale

Habitat/Range: Rare (overlooked?) over deciduous trees, especially Garry oak, in coastal localities, perhaps restricted in BC to CDF zone; western N Am, N to BC, S to CA.

Reactions: All spot tests negative.

Contents: No lichen substances reported.

XANTHOPARMELIA

Xanthoparmelia **Hale** **The Rockfrog Lichens**

Small to large ***stratified foliose lichens***, corticate above and below, sorediate or isidiate or not, lobes tightly appressed to semi-erect, elongate to elongate-linear, averaging to 0.5–5 mm wide, thin to somewhat thickened. Upper surface ***pale yellowish green***, K-, rarely white-maculate, somewhat shiny. Lower surface pale to black, somewhat shiny, bearing scattered short, simple or sparingly branched rhizines. Medulla white (ours). Photobiont green.

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

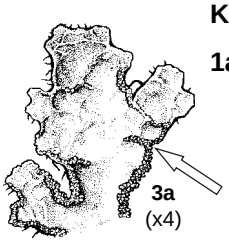
Over rock, rarely over soil or moss.

Reference: Hale (1990).

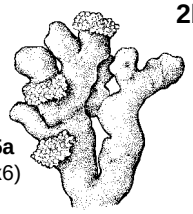
Common Name: Suggested by the greenish colour of the upper surface, as well as the strict association with rock surfaces.

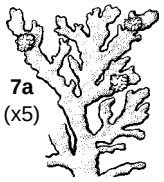
Notes: *Xanthoparmelia* contains about 400 species worldwide, of which 51 species occur in North America and eight in B.C. *Xanthoparmelia* is taxonomically the most difficult of the genera previously united within *Parmelia*. Reliable identification of many species depends on a knowledge of the chemical substances they contain. Though this is most reliably attained through use of thin-layer chromatography, the chemistry of the B.C. species can usually be surmised from the medullary reaction with K. Two character states are recognized: K+ finally reddish orange or orangish red (i.e., salazinic acid present), and K+ finally yellow or medium orange (stictic acid present). The distinction between these two reactions can be subtle, depending on the concentration of the chemical substances. In difficult cases, intensify the reaction by applying a second drop of reagent to the test site.

Key to *Xanthoparmelia* and Similar Lichens

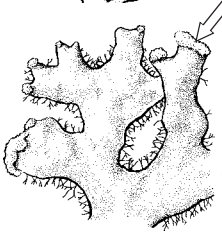

3a (x4)

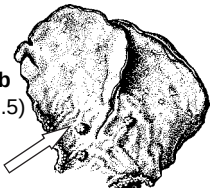

3b, 4a (x2.5)


5a (x6)

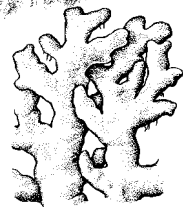

7a (x5)

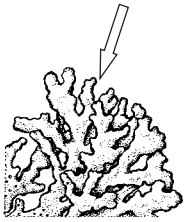

7b (x5)


8a (x2.5)


8b (x2.5)


9a (x2.5)


10a (x5)


11a (x3)

1a Thallus sorediate or isidiate 2

2a Thallus isidiate 3

3a Isidia soft, often soredia-like, located mostly along lobe margins(←); upper surface somewhat checkered/maculate and/or pseudocyphellate; widespread in cool climates ..... ***Parmelia fraudans***

3b Isidia hard-corticate, located mostly over upper surface(←); upper surface not checkered/maculate or pseudocyphellate; southern intermontane 4

4a Medulla K+ finally yellow to medium orangish ..... ***Xanthoparmelia plittii***

4b Medulla K+ finally reddish orange to orangish red ..... ***Xanthoparmelia mexicana***

2b Thallus sorediate 5

5a Lower surface dull and apparently weakly white-pruinose; upper surface also dull throughout; medulla KC+ reddish ..... ***Arctoparmelia***

5b Lower surface usually somewhat shiny, not at all white-pruinose; upper surface shiny or dull; medulla KC+ reddish or KC- 6

6a Broadest lobes averaging to less than 1.5 mm wide; rhizines rarely, if ever, branched 7

7a Upper surface generally shiny throughout, transversely cracked when mature; coastal; over rock; medulla K+ finally yellow to medium orange, PD+ pale orange ..... ***Xanthoparmelia mougeotii***

7b Upper surface often dull toward thallus centre, seldom transversely cracked; widespread; mostly over bark and wood; medulla K- and PD- ..... ***Parmeliopsis ambigua***

6b Broadest lobes averaging to more than 2 mm wide; rhizines sometimes abundantly branched 8

8a Lobes elongate; soredia located entirely over lobe tips(←); medulla K+ finally orangish ..... ***Hypotrachyna sinuosa***

8b Lobes proportionately short and broad; soredia located mostly over upper surface(←); medulla K- ..... ***Flavopunctelia flaventior***

1b Thallus lacking soredia and isidia 9

9a Lobes proportionately short and broad; rhizines absent; alpine; northern; medulla KC+ reddish ..... [***Asahinea chrysantha***]

9b Lobes elongate to elongate-linear; rhizines usually present; distribution various; medulla KC+ reddish or KC- 10

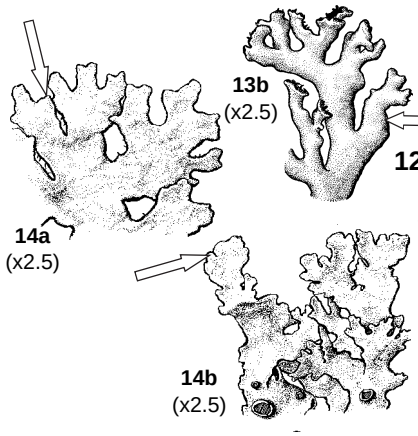
10a Lower surface dull and apparently weakly white-pruinose; upper surface also dull throughout; cool climates; medulla KC+ reddish ..... ***Arctoparmelia***

10b Lower surface somewhat shiny, not at all white-pruinose; upper surface more or less shiny; distribution various; medulla KC- 11

11a Lower surface jet black (except usually brownish near lobe tips); lobes mostly elongate-linear throughout(←), averaging to less than 1 mm wide; dry southern intermontane; rare; medulla K+ finally yellow to medium orange ..... ***Xanthoparmelia planilobata***

11b Lower surface pale tan to brownish (occasionally, however, with scattered black patches); lobes broad to elongate-linear, but usually averaging to more than 1 mm wide; distribution various; common; medulla sometimes K+ finally reddish 12

12a Thallus loosely attached (rarely unattached), occasionally over soil or moss; peripheral lobes mostly elongate-linear; pycnidia absent or sparse over upper surface; lobe margins often distinctly rimmed (check lower surface); dry southern intermontane; medulla K+ finally reddish orange or orangish red 13



13a Thallus growing unattached; upper surface white-maculate .... [***Xanthoparmelia camtschadalis***]

13b Thallus usually more or less attached; upper surface not at all maculate(←) ..... ***Xanthoparmelia wyomingica***

12b Thallus closely to loosely attached, always over rock; peripheral lobes seldom elongate-linear (elongate-linear secondary lobes may, however, be well developed toward thallus centre); lobe margins rarely rimmed; widespread; medulla sometimes K+ yellowish 14

14a Lobe tips often somewhat angular in outline(←); medulla K+ finally reddish orange or orangish red ..... ***Xanthoparmelia coloradoensis***

14b Lobe tips usually rounded in outline(←); medulla K+ finally yellow to medium orangish ..... ***Xanthoparmelia cumberlandia***

[*Xanthoparmelia camtschadalis* (Ach.) Hale]

Vagabond rockfrog

Habitat/Range: Over highly exposed, windblown sites in arid and semi-arid regions; western N Am – western Eurasia – eastern Eurasia.

Reactions: Cortex KC+ yellow; medulla K+ yellow becoming reddish orange or orangish red, PD+ yellowish or orangish.

Contents: Salazinic and usnic acids (and consalazinic acid).

Notes: The unattached habit and white-maculate upper surface are diagnostic. Though *X. camtschadalis* is not known to occur in B.C., Hale (1990) states that it occurs from "Colorado northward into Canada." It should be looked for in windswept sites at lower elevations in the southern Rockies.

***Xanthoparmelia coloradoensis* (Gyelnik) Hale**

(Syn. *Xanthoparmelia taractica* auct., *non Xanthoparmelia taractica* (Krempelhuber) Hale; *Parmelia taractica* auct.)

Questionable rockfrog

Habitat/Range: Frequent over acid rock in open inland sites, except rare at alpine elevations; western N Am, N to YU, S to MX.

Reactions: Cortex KC+ yellow; medulla K+ yellow becoming reddish orange or orangish red, PD+ yellowish or orangish.

Contents: Norsalazinic, norstictic, salazinic and usnic acids (and consalazinic acid).

Notes: The material united here is heterogeneous and appears to represent at least two distinct taxa. The first, *X. coloradoensis* s. str., seems restricted in B.C. to the southern intermontane. This is a rather closely appressed species with smallish primary lobes (averaging to 1–2 mm wide) that usually bear copious secondary lobes toward the thallus centre. The second taxon is more widespread, occurring over much of the province. It is loosely appressed, with comparatively broad lobes (averaging to 2–3.5 mm wide) that seldom, if ever, produce copious secondary lobes. It is most similar to *X. somloensis* (Gyelnik) Hale, though that species has a distinctly maculate upper surface, whereas maculations are lacking in the B.C. material. See also the discussion under *Xanthoparmelia tasmanica* under "Excluded Species."

***Xanthoparmelia cumberlandia* (Gyelnik) Hale**

(Syn. *Parmelia cumberlandia* (Gyelnik) Hale)

Questionable rockfrog

Habitat/Range: Common over acid rock in somewhat sheltered to open coastal and intermontane localities at lower elevations; N Am, N to BC, S to MX.

Reactions: Cortex KC+ yellow; medulla K+ finally yellow to medium orange, PD+ orangish.

Contents: Constictic, norstictic, stictic and usnic acids (and menegazzic acid).

Notes: The material is heterogeneous. Some hypermaritime specimens essentially lack the secondary lobes otherwise characteristic of *X. cumberlandia*. A second variant occurs in the south Okanagan and may represent an undescribed species. While similar in appearance to *X. cumberlandia*, it gives a K+ dingy orangish, PD- medullary reaction.

Xanthoparmelia mexicana (**Gyelnik**) **Hale** Map 122

(Syn. *Parmelia mexicana* Gyelnik)

Salted rockfrog

Habitat/Range: Infrequent over acid rock in open, often somewhat exposed semi-arid intermontane localities at lower elevations; western N Am – eastern Eurasia, N to BC, S to MX.

Reactions: Cortex KC+ yellow; medulla K+ finally reddish orange to orangish red, PD+ orangish.

Contents: Salazinic and usnic acids (and consalazinic and norstictic acids).

Xanthoparmelia mougeotii (**Schaerer**) **Hale**

(Syn. *Parmelia mougeotii* Schaerer)

Powdered rockfrog

Habitat/Range: Frequent over acid rock in somewhat sheltered coastal localities (CDF zone); western N Am – western Eurasia, N to BC, S to CO.

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

Contents: Constictic, norstictic, stictic and usnic acids.

Xanthoparmelia planilobata (**Gyelnik**) **Hale** Map 123

Mini rockfrog

Habitat/Range: Rare over acid rock in open to sheltered semi-arid intermontane localities at lower elevations; western N Am, N to southern BC, S to MX.

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

Contents: Constictic, norstictic, stictic and usnic acids (and menegazzic acid).

Notes: See the remarks under *X. hypopsila* in "Excluded Species."

Xanthoparmelia plittii (**Gyelnik**) **Hale**

(Syn. *Parmelia plittii* Gyelnik)

Salted rockfrog

Habitat/Range: Frequent over acid rock in open, semi-arid or dry intermontane localities at lower elevations; western N Am, N to southern BC, S to Mx.

Reactions: Cortex KC+ yellow; medulla K+ finally yellowish to medium orange, PD+ orangish.

Contents: Constictic, norstictic, stictic and usnic acids (and menegazzic acid and one unknown substance).

Xanthoparmelia wyomingica (**Gyelnik**) **Hale**

(Syn. *Parmelia wyomingica* (Gyelnik) Hale)

Variable rockfrog

Habitat/Range: Frequent over acid rock and mossy earth in open, semi-arid or dry intermontane localities at lower elevations; western N Am, N to BC, S to NM.

Reactions: Cortex KC+ yellow; medulla K+ finally reddish orange or orangish red, PD+ orangish.

Contents: Salazinic and usnic acids (and consalazinic and norstictic acids).

Notes: Hale (1990) states that *X. wyomingica* is commonly pycnidiate, though the B.C. material rarely produces pycnidia.

XANTHORIA

Xanthoria (**Fr.**) **Th. Fr.** **The Orange Lichens**

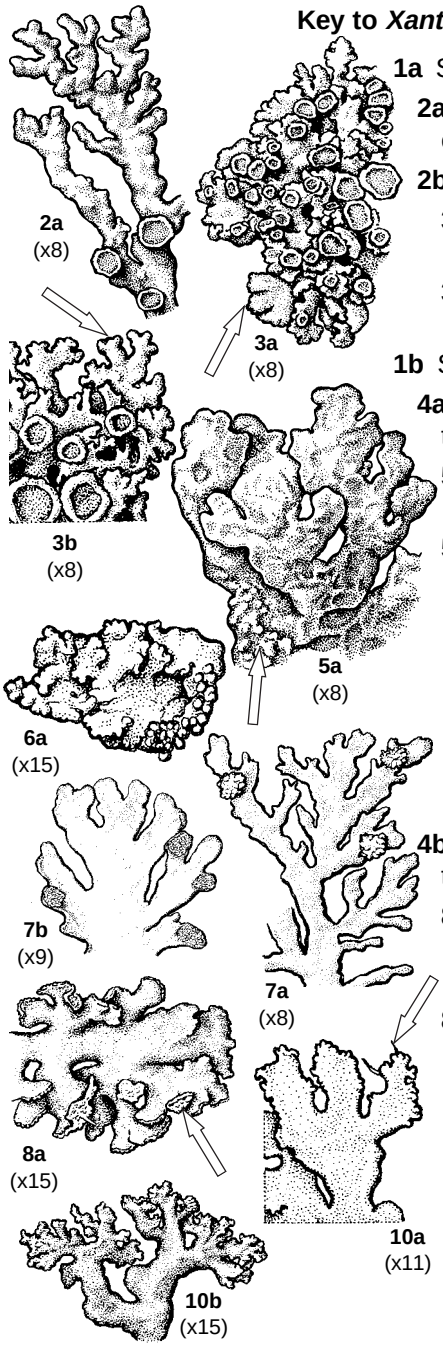
Minute to small stratified foliose or occasionally fruticose lichens, corticate above and below, sorediate or isidiate or not, lobes closely appressed to loosely attached or semi-erect, short to more often elongate or elongate-linear, averaging to 0.3–1 (–2) mm wide, thin or somewhat thick. Upper surface ***orange or orangish***, ***K+ purple***. Lower surface pale, often whitish, often bearing scattered, short, simple rhizines. Medulla white. Photobiont green. Apothecia located over upper surface, disc orange; spores 2-celled, ellipsoid, colourless, 8 per ascus.

Over base-rich rock and bark, occasionally over bone.

Reference: Thomson (1984).

Common Name: Reflects the basic colour of the species.

Notes: *Xanthoria* is primarily a temperate genus consisting of approximately 15 species worldwide. Ten are reported for North America and six for B.C. The western Xanthoriae are in need of taxonomic revision; therefore the following account is tentative, pending further study. Chemistry is of little taxonomic value in this genus and is omitted in the following accounts.



Key to *Xanthoria* and Similar Lichens

1a Soredia and isidia absent 2

2a Over rock; lobes closely to rather closely appressed to substrate (rarely semi-erect) ..... ***Xanthoria elegans***

2b Over bark; lobes closely appressed to semi-erect 3

3a Lobes more or less closely appressed and tightly overlapping, mostly short(←), dorsiventral throughout ..... ***Xanthoria polycarpa***

3b Lobes loosely appressed to semi-erect, also loosely overlapping, elongate at maturity(←), often partly cylindrical ..... ***Xanthoria ramulosa***

1b Soredia and/or isidia present 4

4a Isidia and/or soredia located over upper surface (including upper surface of lobe tips) 5

5a Isidia and/or soredia diffuse over upper surface(←); over rock; upper surface usually orangish, K+ purplish ..... ***Xanthoria sorediata***

5b Isidia absent; soredia confined to discrete soralia; over bark or rock; upper surface yellowish green, K- 6

6a Lobes minute, averaging to less than 0.2 mm wide .... ***Candelaria concolor***

6b Lobes averaging to more than 0.4 mm wide 7

7a Over rock; upper surface generally somewhat shiny throughout; coastal; medulla K+ yellow, PD+ orange ..... ***Xanthoparmelia mougeotii***

7b Over bark (very rare over rock); upper surface generally dull toward thallus centre; widespread; medulla K-, PD- ..... ***Parmeliopsis ambigua***

4b Isidia and/or soredia located mostly along lobe margins and/or lobe tips, sometimes also developing on lower surface 8

8a Lobes proportionately rather short and broad, sorediate, soredia clustered along lobe margins and especially the lower surface(←); rhizines present; over bark ..... ***Xanthoria fallax***

8b Lobes proportionately rather long and narrow; soredia and/or isidia present, loosely scattered along lobe margins and/or lobe tips; rhizines present or absent; over bark or rock 9

9a Lobes averaging to less than 0.2 mm wide; upper surface yellowish green, K- ..... ***Candelaria concolor*** (see lead **6a**)

9b Lobes usually averaging to more than 0.2 mm wide; upper surface orange (except sometimes yellowish green in shaded sites), K+ purplish 10

10a Lower surface bearing sparse rhizines(←) ..... ***Xanthoria*** sp. 1

10b Lower surface lacking rhizines ..... ***Xanthoria candelaria***

Xanthoria candelaria (**L.**) **Th. Fr.**

Shrubby orange

Habitat/Range: Frequent over base-rich (or base-enriched) rock or bark in open sites throughout; circumpolar, S (at least) to NM.

Notes: The material included here is apparently heterogeneous, the lobes being short and proportionately broad in some specimens and elongate and distinctly narrow in others. The former specimens resemble *X. fallax*.

Xanthoria elegans (**Link**) **Th. Fr.**

(Syn. *Caloplaca elegans* (Link) Th. Fr.)

Elegant orange (rock orange)

Habitat/Range: Common over base-rich (or base-enriched) rock in open sites throughout, except probably absent in hypermaritime localities; circumpolar, S (at least) to CA.

Notes: The B.C. material is apparently heterogeneous.

Xanthoria fallax (**Hepp *in* Arnold**) **Arnold**

Powdered orange

Habitat/Range: Frequent over base-rich bark, rare over rock, in open to somewhat shaded sites at lower elevations throughout, except probably absent in hypermaritime and boreal regions; circumpolar, S (at least) to NM.

Notes: See notes under *X. candelaria* and *X.* sp. 1.

Xanthoria polycarpa (**Hoffm.**) **Rieber**

Pincushion orange (lumpy shore lichen)

Habitat/Range: Frequent over base-rich bark in open inland sites at lower elevations; circumpolar, S (at least) to NM.

Notes: The material included here is heterogeneous.

Xanthoria ramulosa (**Tuck.**) **Herre**

Pincushion orange

Habitat/Range: Frequent over base-rich bark in open coastal sites at lower elevations; western N Am, S to CA.

Notes: Some authors place this material with *X. polycarpa*.

Xanthoria sorediata (**Vainio**) **Poelt** Map 124

Sugared orange

Habitat/Range: Infrequent over base-rich rock in open inland sites at lower elevations; circumpolar, S to UT.

***Xanthoria* sp. 1**

Powdered orange

Habitat/Range: Frequent over base-rich bark, less common over rock, in open to somewhat shaded sites at low-land elevations throughout; global distribution unknown.

Notes: *Xanthoria* sp. 1 may be characterized as a rhizinate species with narrow, elongate lobes that are distinctly lobulate at the tips (check young lobes). Some forms of *X. candelaria* are similar, but lack rhizines. Also similar is *X. fallax*, in which the lobes are proportionately short and broad and the lobe tips only weakly lobulate.

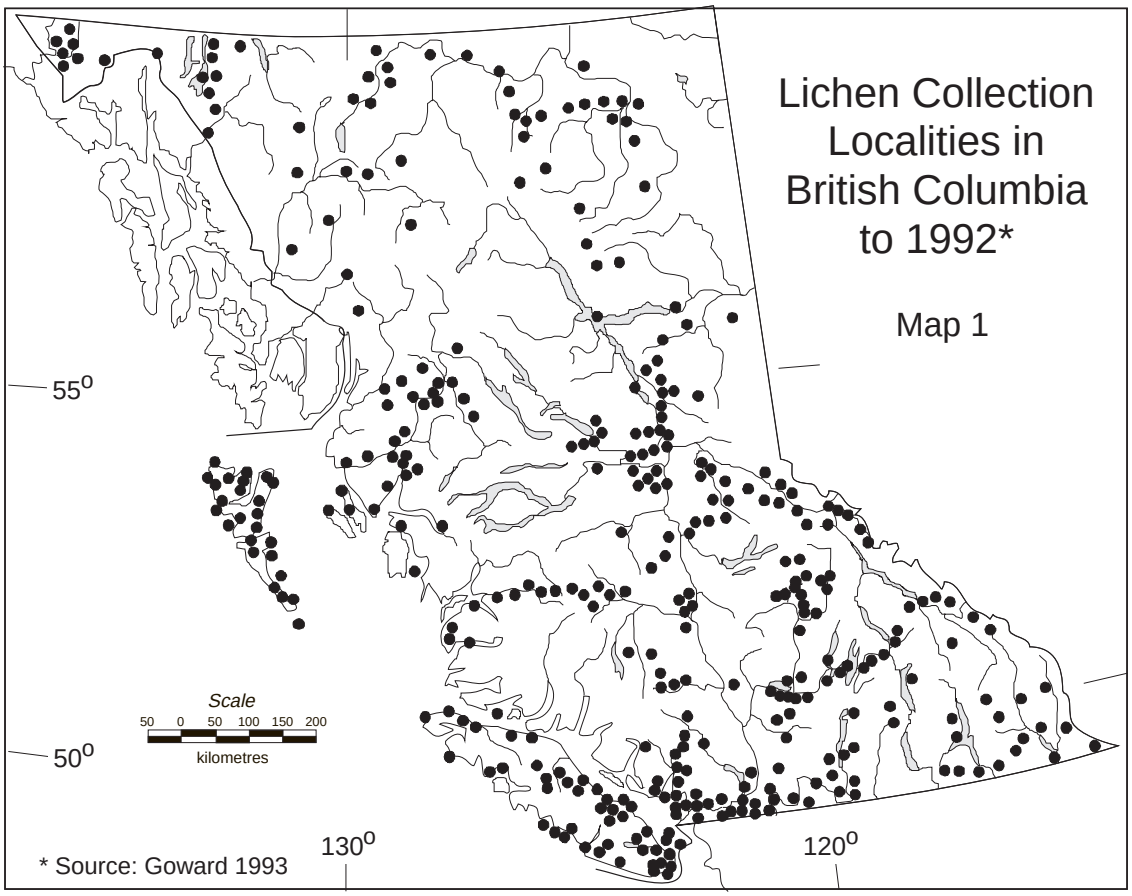
APPENDIX 1. Distribution maps of rare and infrequent foliose and squamulose lichens in British Columbia

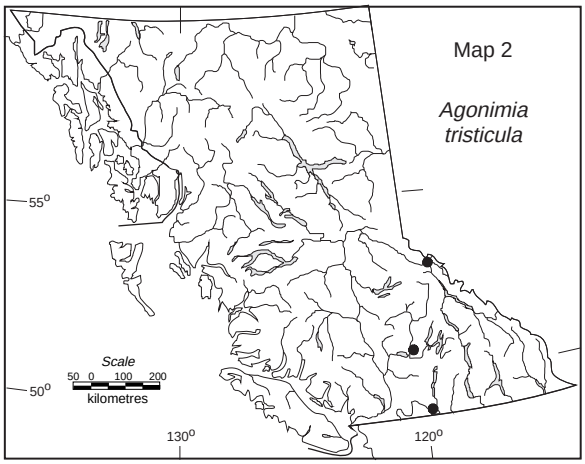
The following maps were prepared primarily from specimens housed at the National Museum of Natural Sciences (CANL) in Ottawa and at the University of British Columbia (UBC) in Vancouver. Authoritative literature provided additional information. Map 1 attempts to summarize the locations of all lichen collections made to 1992. This map should be contrasted with Figure 1 (page 1), which provides a summary of localities at which intensive collection has been undertaken.

With few exceptions (see below), all species known from fewer than eight to ten British Columbia localities are mapped. Maps have been prepared also for a few species of somewhat more frequent occurrence that are nevertheless considered to be vulnerable to logging, mining, agriculture, urban development or other human activity. It must be stressed, however, that most of these maps are based on inadequate collecting: many lichens are probably more common than the maps would suggest. Others (e.g., species at the northern or southern edge of their range) may be rare or infrequent in British Columbia as a whole, but are locally frequent or even common in some areas of the province. The following species, though judged to be rare or infrequent, have not been mapped, owing to taxonomic problems: *Leptogium minutissimum*, *L. tenuissimum*, *L. tetetiusculum*, *Pannaria maritima*, *Peltigera degenii* and *P. lactucifolia*.

Localities in southeast Alaska are also mapped. These records are based on Geiser et al. (1994), and have been included courtesy of the U.S. Forest Service, Tongass National Forest/Stikine Area. The specimens upon which these records are based have not been examined by the authors.

The collections of John Macoun (1831–1920) pose a special problem to mapping because of numerous errors in labelling (Godfrey 1977). Records based on Macoun's specimens are signalled by use of an open circle and should be interpreted with caution.




Map 2
Agonimia tristicula
55°
50°
Scale
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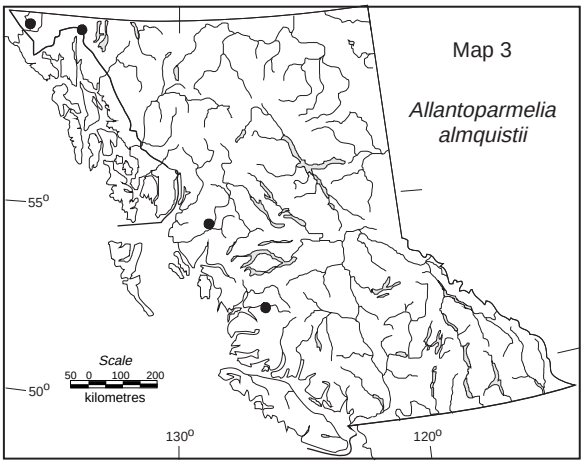
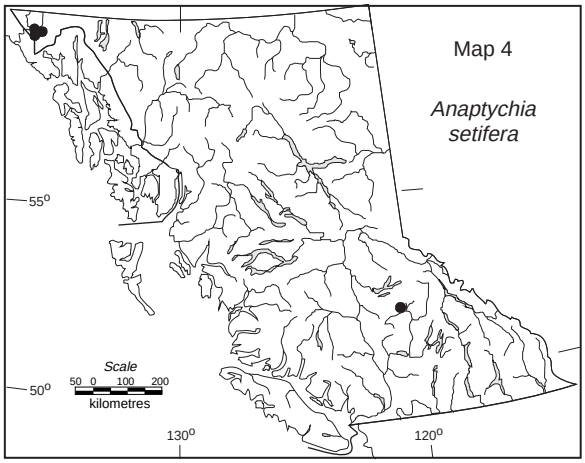
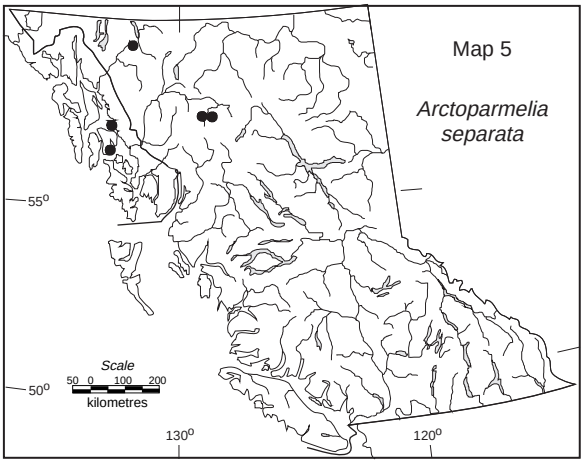
kilometres
130°
120°


Map 3
Allantoparmelia almquistii
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 4
Anaptychia setifera
55°
50°
Scale
50 0 100 200
kilometres
130°
120°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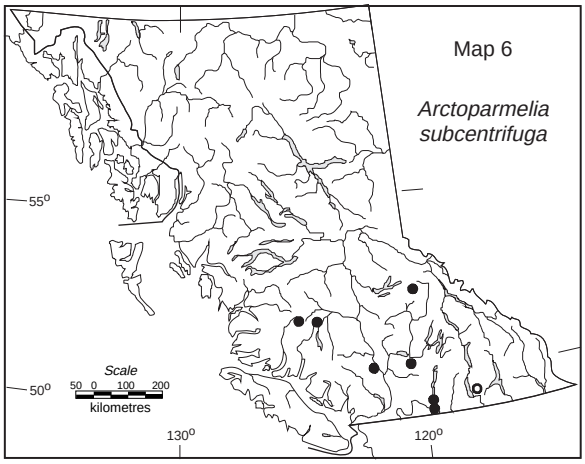
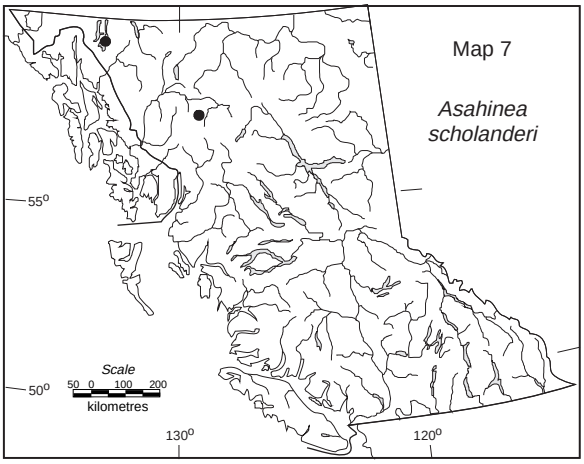
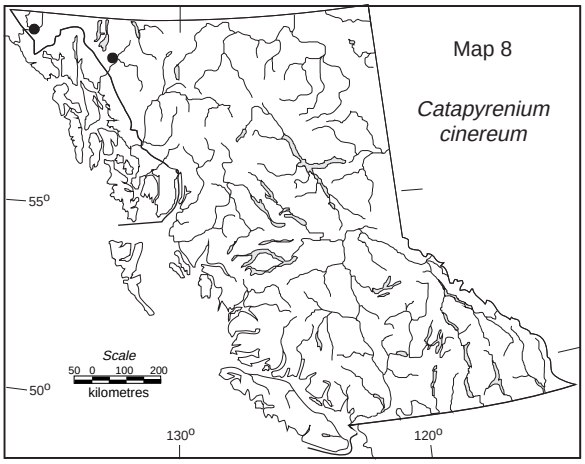
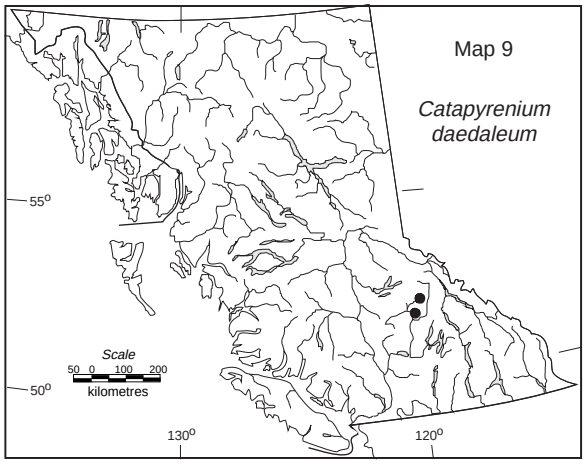
Arctoparmelia separata
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 6
Arctoparmelia subcentrifuga
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 7
Asahinea scholanderi
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 8
Catapyrenium cinereum
55°
50°
Scale
50 0 100 200
kilometres
130°
120°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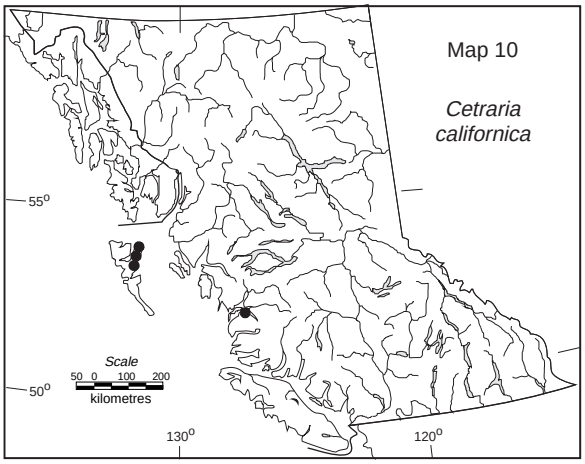
Catapyrenium daedaleum
55°
50°
Scale
50 0 100 200
kilometres
130°
120°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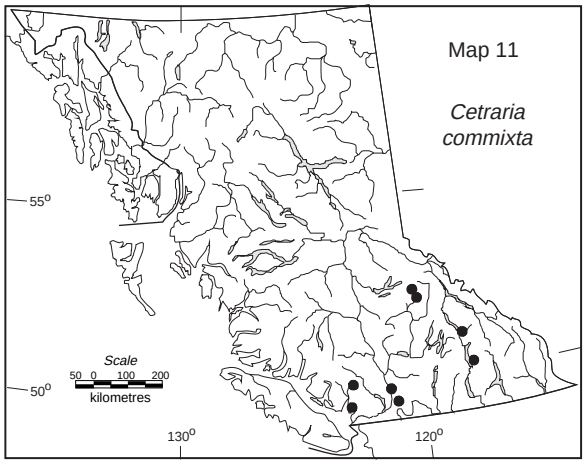
Cetraria californica
55°
50°
Scale
50 0 100 200
kilometres
130°
120°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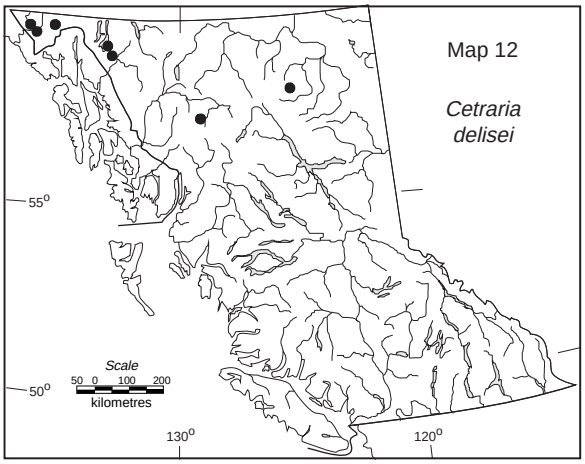
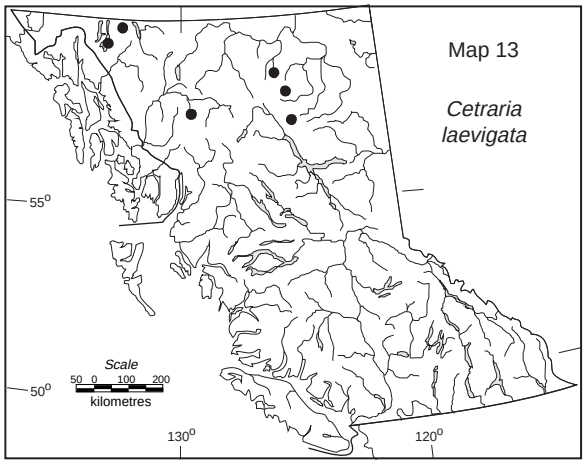
Cetraria commixta
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 12
Cetraria delisei
55°
50°
Scale
50 0 100 200
kilometres
130°
120°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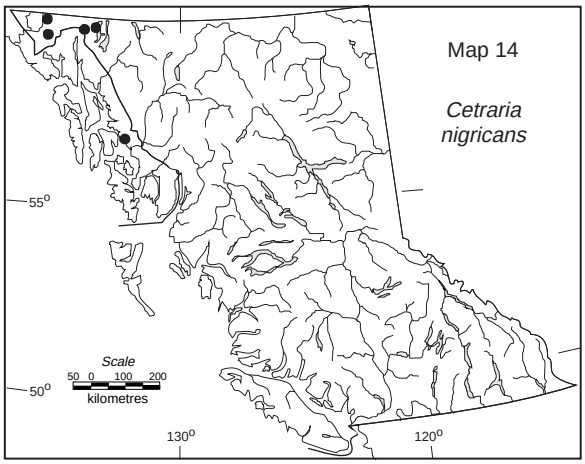
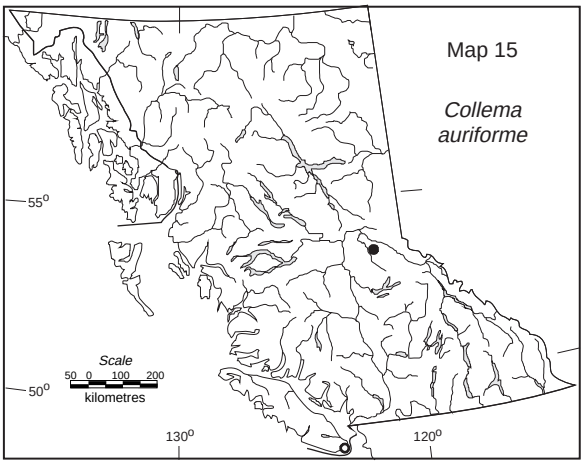
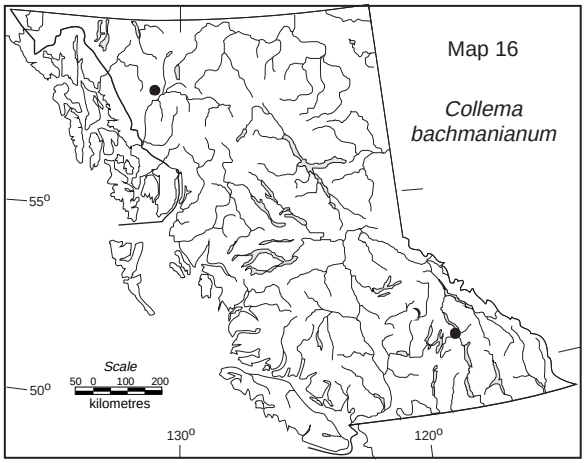
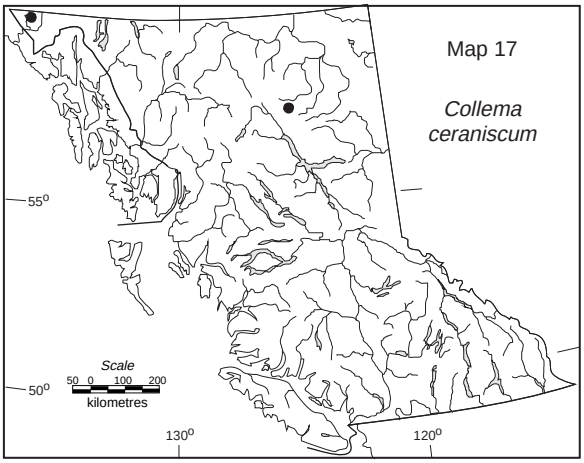
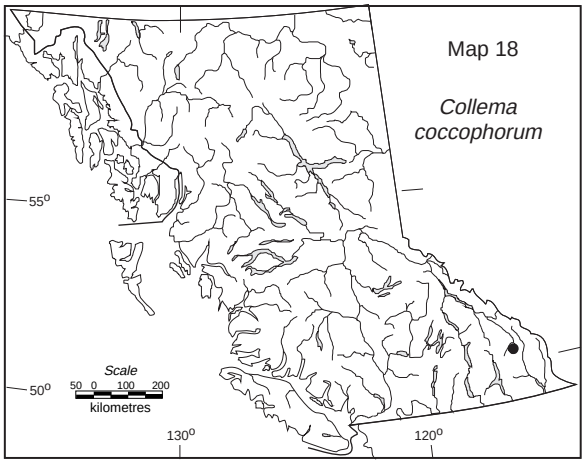
Cetraria laevigata
55°
50°
Scale
50 0 100 200
kilometres
130°
120°

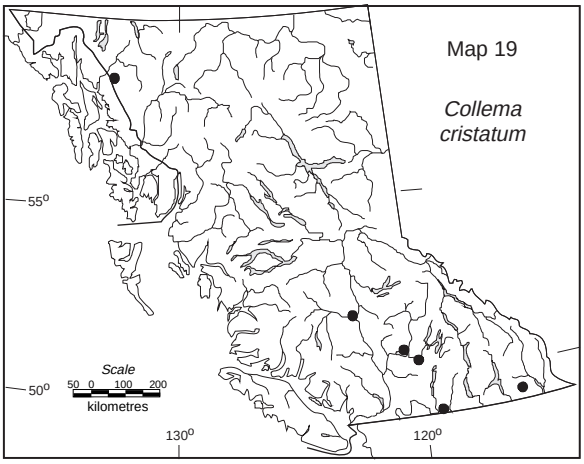

Map 14
Cetraria nigricans
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 15
Collema auriforme
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 16
Collema bachmanianum
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 17
Collema ceraniscum
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 18
Collema coccophorum
55°
50°
Scale
50 0 100 200
kilometres
130°
120°


Map 19
Collema cristatum
55°
50°
Scale
50 0 100 200
kilometres
130°
120°