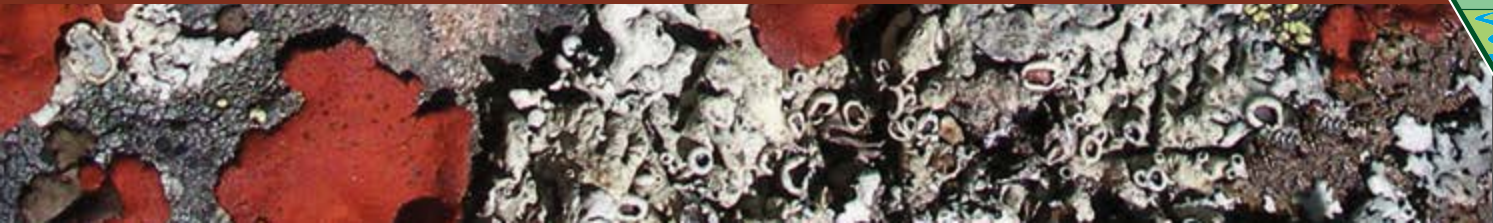




Rare Lichens of Oregon

Ronald L. Exeter • Charity Glade • Scot Loring



Rare Lichens of Oregon



Teloschistes flavicans

Rare Lichens of Oregon

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Rare Lichens of Oregon

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Abstract.

This Bureau of Land Management publication provides species-specific information on 78 special status lichen species included in the 2016 publication of *Rare, Threatened and Endangered Species of Oregon* by the Oregon Biodiversity Information Center (ORBIC). Additionally, *Leptogium compactum* is included and considered rare in Oregon. Individual treatments include synonyms, common names, field summaries, diagnostic characters, species descriptions, ecologies, distributions, similar species, and county distribution maps. Also included are species distribution maps by Oregon counties and over 290 photos and drawings. This publication is available from the Salem Bureau of Land Management, located in Salem, Oregon, USA.

Key words: BLM, Bureau of Land Management, rare, endangered, lichen, Oregon, ORBIC.

Rare Lichens of Oregon

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Daphne Stone, *Veizdaea stipitata*

Ron Exeter, *Chaenothecopsis rubescens*, *Sclerophora peronella* (b, c, d), *Pilophorus* (d, e), photobionts

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Alexander Mikulin: *Buellia oidalea*, *Calicium abietinum*, *Calicium adpersum*, *Collema curtisporum*, *C. nigrescens*, *Leioderma solediatum*, *Lobaria linita*, *Nephroma occultum*, *Niebla cephalota*, *Pannaria rubiginosa*, *Pilophorus nigricaulis*, *Pseudocyphellaria rainierensis*, *Pyrrhospora quernea*, *Ramalina pollinaria*, *Sticta arctica*, *Teloschistes flavicans*, *Tholurna dissimilis*, *Usnea hesperina*.

Eric Peterson: edit of *Pyrrhospora quernea*.

Color Bar Key







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Introduction

This Bureau of Land Management (BLM) publication provides species-specific information on Oregon's special status lichens included in the Oregon Biodiversity Information Center's (ORBIC) 2016 publication: Rare, Threatened and Endangered Species of Oregon. Species data include: synonyms, common names, field summaries, diagnostic characters, species descriptions, ecologies, distributions, similar species, and Oregon distribution maps.

The 2013 ORBIC publication included: *Bryoria pseudocapillaris*, *Bryoria subcana*, *Stenocybe clavata* and *Stenocybe major*. These species are now omitted due to additional sites and distribution. *Leptogium burnetiae*, not known from North America, is excluded.

Name changes since 2013 include: *Circinaria rogeri* (Sohrabi) Sohrabi (= *Aspicilia rogeri* Sohrabi), *Gyalolechia stantonii* (W.A. Weber) Søchting, et al. (= *Caloplaca stantonii* W.A. Weber), *Pseudocyphellaria hawaiiensis* Moncada, et al. (= *Pseudocyphellaria perpetua* McCune and Miadlikowska), and *Usnea subgracilis* Vainio (= *Usnea schadenbergiana* Göppert and Stein).

Although not included on the 2016 ORBIC list of taxa of concern, the authors include *Leptogium compactum* D.F. Stone et al., a newly described western North American endemic with only 3 sites in the contiguous United States, one in Oregon.

New additions in the 2016 ORBIC list of taxa of concern include: *Cetraria subalpina*, *Chaenotheca balsamconensis*, *Chaenothecopsis vainioana*, *Cladonia concinna*, *Cladonia poroscypha*, *Cladonia prolifica*, *Fuscopannaria laceratula*, *Letharia gracilis*, *Peltigera cinnamomea*, *Peltigera hymenina*, *Umbilicaria nodulospora*, and *Usnea ceratina*.

The authors choose to defer a detailed lichen introduction to other available resources, and recommend *Macrolichens of the Pacific Northwest, 2nd edition*, by Bruce McCune and Linda Geiser. Included in that publication are an introduction to lichens and a primer on collecting and identifying lichens, including a section on identifying lichens using microchemistry which discusses methods of preparation and application of chemical reagents. The McCune and Geiser publication is considered the premier publication for macrolichen identification in the Pacific Northwest. Brodo et al. (2001) also provides an extensive introduction to lichen anatomy, morphology, and chemistry. Both of these resources include glossaries of lichen terms.

Data for individual species was mostly obtained through professional knowledge of the authors and research of scientific journals, monographs, and primarily the following publications:

Macrolichens of the Pacific Northwest, 2nd edition — Bruce McCune and Linda Geiser

Lichens of North America — Irwin M. Brodo, Sylvia Duran Sharnoff, and Stephen Sharnoff

Lichen Flora of the Greater Sonoran Desert Region, Volumes 1, 2 and 3 — T.H. Nash III, B.D. Ryan, C. Gries, F. Bungartz, and P. Diederich

Nordic Lichen Flora, Volumes 1, 2 and 3 — Teuvo Ahti, Per Magnus Jørgensen, Hörður Kristinsson, Roland Moberg, Ulrik Søchting, and Göran Thor, eds.

American Arctic Lichens, 1. Macrolichens and 2. Microlichens — John W. Thomson.

Introduction

When references were not available, BLM and United States Forest Service (USFS) species fact sheets and management recommendations were consulted.

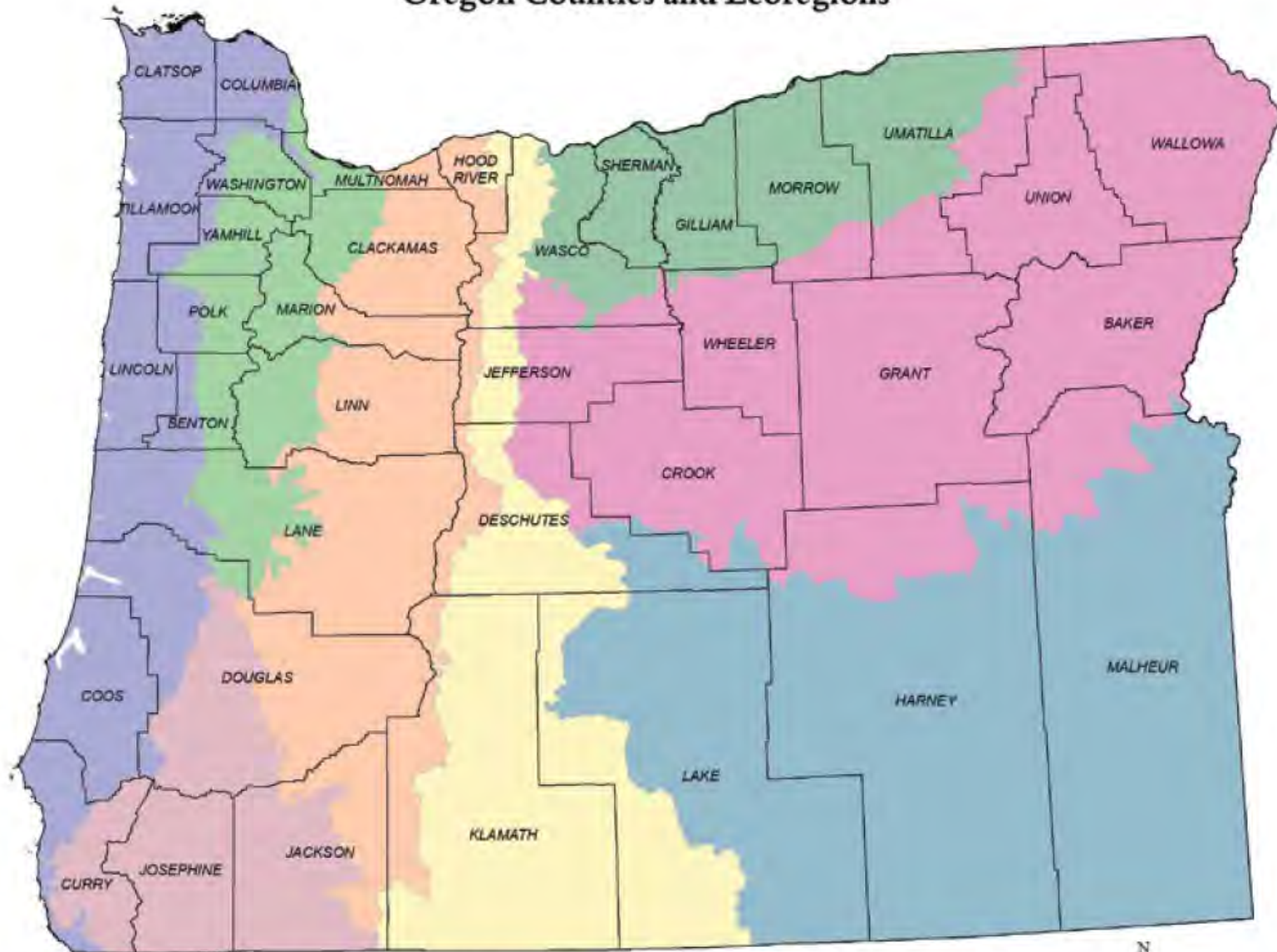
Indexfungorum.org was consulted for fungal species author names and identification of synonyms.

Species distributions were initially determined by professional knowledge of the authors and the 2013 Oregon Biodiversity Information Center publication, then verified and supplemented by searching rare species databases including: Geographic Biotic Observations (GeoBOB), Interagency Special Status/Sensitive Species Program (ISSSSP); general species databases including; Consortium of Pacific Northwest Herbaria, Oregon State University Mycological Collections Database, USFS National Lichens and Air Quality Database and Clearinghouse, and NatureServe; as well as literature searches and personal communications with USFS and BLM botanists and original collectors.









A map of Oregon counties and ecoregions is included on the following page, followed by a summary table of rare Oregon lichens by ecoregion. Both complement individual species county distribution maps and would be useful in identifying areas to search suitable habitat for rare species.

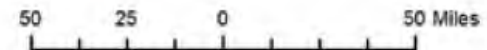
In this publication, macrolichens are treated first, followed by microlichens.

Oregon Counties and Ecoregions



Ecoregions of Oregon

- | | | |
|---|--|--|
|  Coast Range |  West Cascades |  Blue Mountains |
|  Willamette Valley |  East Cascades |  Northern Basin and Range |
|  Klamath Mountains |  Columbia Basin | |

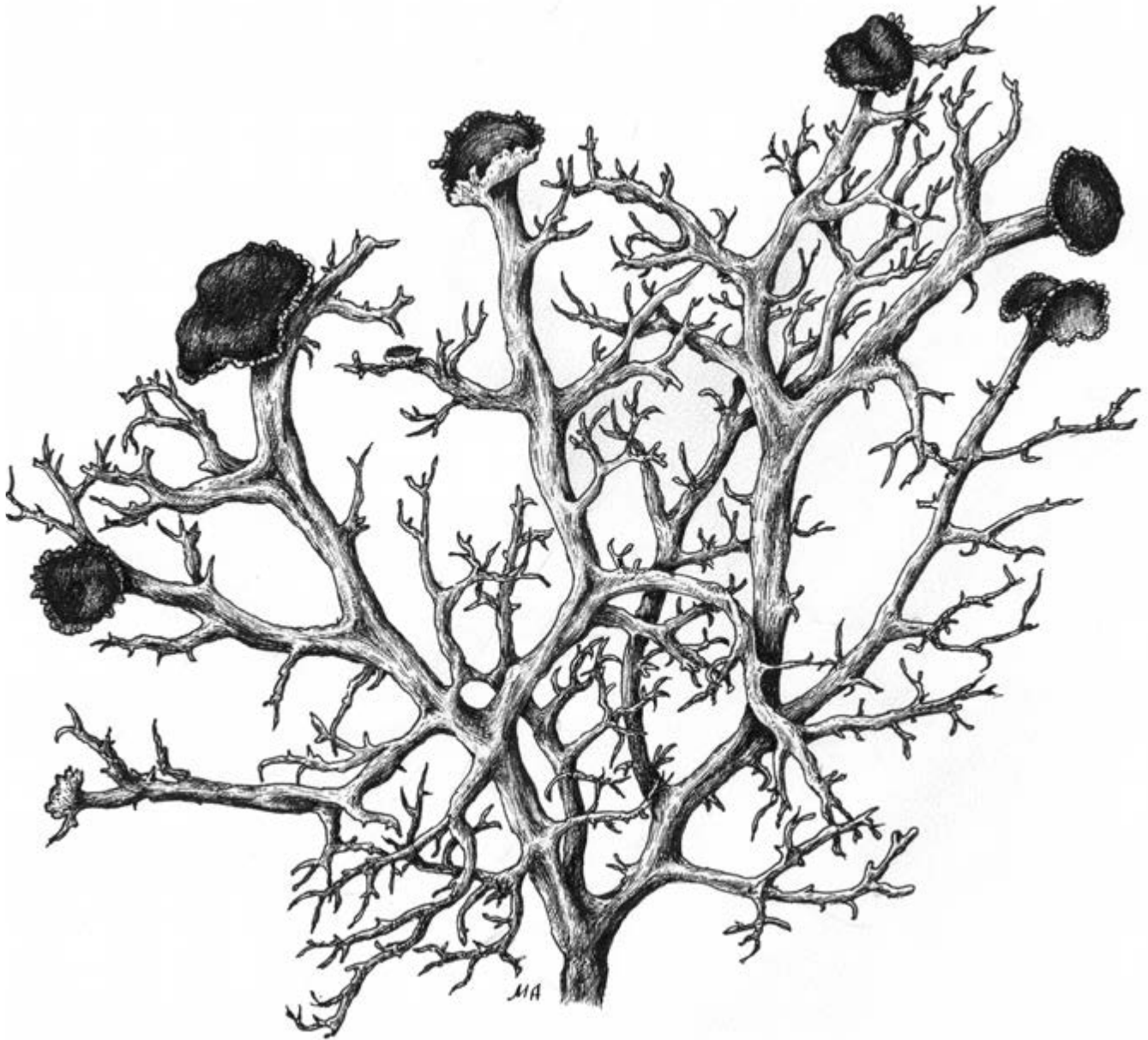


Lichen species	Coast Range	Willamette Valley	Klamath Mountains	West Cascades	East Cascades	Columbia Basin	Blue Mountains	Northern Basin and Range
<i>Anaptychia crinalis</i>	X							
<i>Bryoria bicolor</i>	X							
<i>Buellia oidealea</i>	X							
<i>Calicium abietinum</i>	X		X	X				
<i>Calicium adpersum</i>	X	X						
<i>Calicium quercinum</i>		X						
<i>Cetraria subalpina</i>				X				
<i>Chaenotheca balsamconensis</i>				X				
<i>Chaenothecopsis rubescens</i>		X		X				
<i>Chaenothecopsis vainioana</i>		X						
<i>Circinaria rogeri</i>							X	X
<i>Cladidium bolanderi</i>	X							
<i>Cladonia concinna</i>	X							
<i>Cladonia poroscypha</i>			X					
<i>Cladonia prolifca</i>	X							
<i>Collema curtisporum</i>				X			X	
<i>Collema quadrifidum</i>			X	X			X	
<i>Collema undulatum</i> var. <i>granulosum</i>			X					
<i>Dermatocarpon polyphyllizum</i>							X	
<i>Ephebe solida</i>	X			X				
<i>Fuscopannaria laceratula</i>	X							
<i>Gyalolechia stantonii</i>	X							
<i>Heterodermia japonica</i>	X							
<i>Heterodermia sitchensis</i>	X							
<i>Heterodermia speciosa</i>	X							

Lichen species	Coast Range	Willamette Valley	Klamath Mountains	West Cascades	East Cascades	Columbia Basin	Blue Mountains	Northern Basin and Range
<i>Hypogymnia pulverata</i>	X							
<i>Hypogymnia subphysodes</i>	X							
<i>Hypotrachyna revoluta</i>	X	X		X				
<i>Hypotrachyna riparia</i>		X		X				
<i>Lecanora caesiorubella</i> ssp. <i>merrillii</i>	X		X					
<i>Leioderma soreddiatum</i>	X							
<i>Leptogium compactum</i>				X				
<i>Leptogium cyanescens</i>	X			X				
<i>Leptogium platynum</i>	X	X	X	X				
<i>Leptogium plicatile</i>	X		X					
<i>Leptogium siskiyouensis</i>			X					
<i>Letharia gracilis</i>			X	X				
<i>Lobaria linita</i>	X		X	X				
<i>Melanelia commixta</i>				X				
<i>Microcalicium arenarium</i>	X			X				
<i>Nephroma occultum</i>				X				
<i>Niebla cephalota</i>	X							
<i>Ochrolechia subplicans</i>	X							
<i>Pannaria rubiginella</i>	X			X				
<i>Pannaria rubiginosa</i>	X							
<i>Peltigera cinnamomea</i>			X	X			X	
<i>Peltigera hymenina</i>	X							
<i>Peltula euploca</i>			X	X	X		X	X
<i>Pilophorus nigricaulis</i>	X			X				
<i>Pseudocyphellaria hawaiiensis</i>	X	X		X				
<i>Pseudocyphellaria mallota</i>	X			X				
<i>Pseudocyphellaria rainierensis</i>	X			X				

Lichen species	Coast Range	Willamette Valley	Klamath Mountains	West Cascades	East Cascades	Columbia Basin	Blue Mountains	Northern Basin and Range
<i>Pyrrhospora quereua</i>	X							
<i>Ramalina intermedia</i>			X					
<i>Ramalina pollinaria</i>	X			X				
<i>Schaereria dolodes</i>		X	X	X			X	
<i>Sclerophora amabilis</i>			X	X				
<i>Sclerophora peronella</i>	X	X	X	X				
<i>Sigridea californica</i>	X							
<i>Solorina spongiosa</i>							X	
<i>Stereocaulon spathuliferum</i>				X				
<i>Sticta arctica</i>	X							
<i>Sticta weigelii</i>	X	X		X				
<i>Teloschistes flavicans</i>	X							
<i>Texasporium sancti-jacobi</i>						X	X	
<i>Thelella muscorum</i> var. <i>octospora</i>							X	
<i>Thelomma mammosum</i>	X							
<i>Tholurna dissimilis</i>				X	X			
<i>Umbilicaria hirsuta</i>			X	X				
<i>Umbilicaria nodulospora</i>					X		X	
<i>Umbilicaria phaea</i> var. <i>coccinea</i>			X		X			
<i>Umbilicaria proboscidea</i>			X				X	
<i>Umbilicaria rigida</i>				X	X			
<i>Usnea ceratina</i>	X							
<i>Usnea lambii</i>				X				
<i>Usnea nidulans</i>	X							
<i>Usnea rubicunda</i>	X			X				
<i>Usnea subgracilis</i>	X	X	X	X				
<i>Ve-zdaea stipitata</i>		X		X				

Macrolichens



Alexander Mikulin

Anaptychia crinalis (Schleicher) Vězda

Recent synonyms:

Anaptychia setifera Räsäned (misapplied in N. America)

Anaptychia kaspica Gyelnik (misapplied in N. America)

Common name: hanging fringe lichen, eyed centipede

FIELD SUMMARY — A foliose to semi-fruticose lichen, lacking a lower cortex, with strap-like lobes, rhizines, cilia, and a green photobiont. Saxicolous, but mostly epiphytic in the Pacific Northwest.

Diagnostic characters — *Anaptychia crinalis* can be distinguished by its (1) differentiated upper and lower surfaces, (2) lack of a lower cortex, (3) presence of cilia, (4) lack of soredia, and (5) negative K test.

Description

THALLUS — foliose to semi-fruticose with differentiated upper and lower surfaces, 4–8 cm wide, whitish-gray, occasionally grayish-brown to brown; lobes elongate to linear, up to 8 (11) cm long and 0.1–0.6 (1.5) mm wide, attached to substrate at the base, mostly dichotomously branched and tangled, prostrate to erect or pendant, flattened where branching basally, toward apices becoming convex to nearly rounded in cross-section and appearing subfruticose; upper surface matte, smooth or minutely tomentose; lower surface of lobes flat or channeled, mostly lacking a cortex, exposing the white medulla. —soredia and isidia absent. —rhizines sparse and located near the lobe edges, and intergrading with marginal cilia. —cilia marginal, near the lobe tips, long, pale or dark. —pycnidia black, immersed in thallus, conidia cylindrical, $3.5\text{--}6 \times 1 \mu\text{m}$. —photobiont green (*Trebouxia*).

APOTHECIA — located near the tips of branches, sparse to frequent, 2–4.5 mm, stipitate; disk dark brown, flat to concave, sometimes with white pruina, margins nearly entire to toothed, spinulose, or more often ciliate. —spores oblong-ellipsoid, hyaline, 1-septate, thin-walled, $15\text{--}21 \times 30\text{--}46 \mu\text{m}$.

CHEMISTRY — cortex and medulla K-, KC-, P-.

Ecology — *Anaptychia crinalis* is found in coastal pine and scrub habitats in Oregon, on wood or bark. Throughout its range, it is also known from rock, bark and twigs from sea level to 8,400 feet in elevation.

Distribution — *Anaptychia crinalis* is known from Eurasia and North America. In western North America, *A. crinalis* is known from Alaska, Northwest Territories, British Columbia, Alberta, Washington, Oregon, and California. In Oregon, *A. crinalis* is reported from Clatsop, Coos, and Curry counties within the Coast Range ecoregion.

Similar species — Other members of *Anaptychia* are foliose, occur on calcareous rock, moss over rock, or alpine sod, and are generally not coastal. *Anaptychia crinalis* is subfruticose. *Heterodermia* is similar, but has a K+ yellow reaction in the cortex and medulla. In addition, several species of *Heterodermia* have soredia, including the similar *H. leucomelos*, which is found in the same habitats as *A. crinalis*.

References with color photos — McCune and Geiser (2009, p. 26), Brodo et al. (2001, p. 160, as *Anaptychia setifera*).

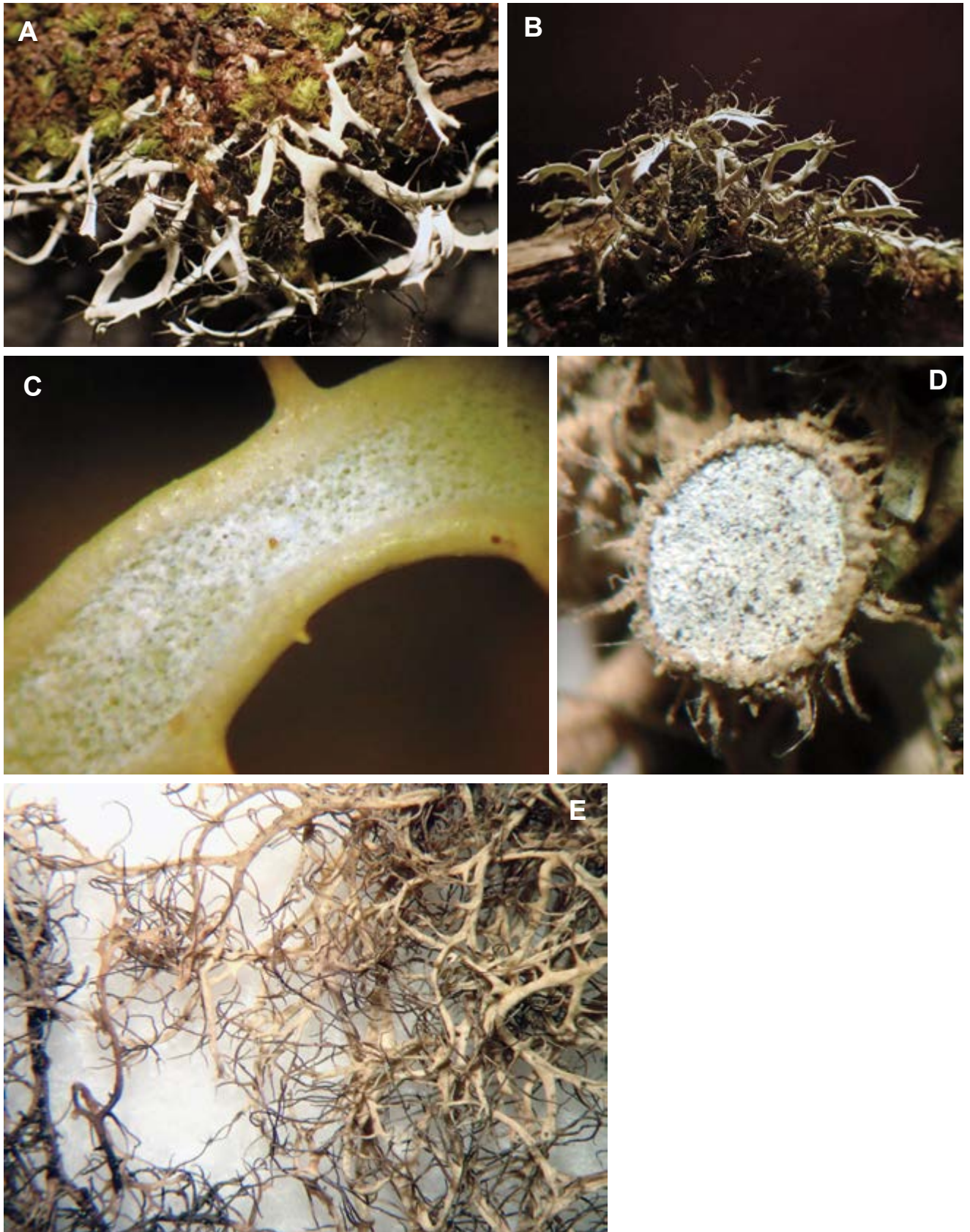


Plate 1. *Anaptychia crinalis*. A–B. Thallus. C. Lower surface. D. Apothecium. E. Thallus.
(A–C: Loring Pers. Coll., D–E: Rosentreter #10098)

Bryoria bicolor (Ehrhart) Brodo and D. Hawksworth

Recent synonym: *Alectoria bicolor* (Ehrhart) Nylander

Common name: electric horsehair, two color horsehair lichen

FIELD SUMMARY — A bi-colored, hair-like fruticose, tufted lichen that lacks soredia, occurs in areas with coastal influences, and has a green photobiont. Epiphytic.

Diagnostic characters — *Bryoria bicolor* can be distinguished by its (1) bi-colored, tufted thallus with third-order branches, (2) lack of soredia, (3) negative K tests, and (4) hypermaritime habitat.

Description

THALLUS — fruticose, densely tufted, erect or more commonly pendant, bi-colored, black at base of branches and main stems with grayish-olive to pale brown upper branches and tips. Stems with third-order perpendicular branches that are generally not flexuose; branches 0.2–0.3 (0.5) mm in diameter, round in cross-section, 2–3.5 (4) cm long. —soredia and isidia absent. —pseudocyphellae scattered, elongate, dark or pale brown, flat or raised. —pycnidia unknown. —photobiont green (*Trebouxia*).

APOTHECIA — unknown.

CHEMISTRY — inner cortex and medulla P+ red; cortex K-, C-, KC-.

Ecology — *Bryoria bicolor* is known from rock and heath, and is epiphytic on Douglas fir, western hemlock, Sitka spruce and red alder in exposed locations, wetlands, and depressions with marine influence at all elevations. In Oregon, it is mostly found at lower elevations within a few miles of the coast.

Distribution — *Bryoria bicolor* is known from Eurasia and North America. In western North America, *B. bicolor* is known from Alaska, British Columbia, Washington, and Oregon. In Oregon, *B. bicolor* is reported from Coos, Clatsop, Douglas, Lincoln, Tillamook and Yamhill counties within the Coast Range ecoregion.

Similar species — *Alectoria*, *Usnea*, *Ramalina*, and *Niebla* all contain usnic acid and are shades of yellow-green. *Bryoria* species lack usnic acid and are white, brownish-white, gray to olive-gray, dark brown to blackish. *Bryoria tenuis* is closely related and also bi-colored, but is P-, does not form dense tufts, and the third order branches are sparse and long-flexuose or lacking in Oregon material.

References — Goward (1999, p. 61).

References with color photos — McCune and Geiser (2009, p. 34).



A



B



C

Plate 2. *Bryoria bicolor*. A. Thallus. B–C. Close-up of thallus branches. (A–C: Loring Pers. Coll.)

Cetraria subalpina Imshaug

Recent synonym: *Tuckermannopsis subalpina* (Imshaug) Kärnefelt

Common name: arboreal Iceland lichen, arboreal wrinkle lichen

FIELD SUMMARY — An olivaceous-green to brown foliose lichen with elongate lobes, submarginal pseudocyphellae, marginal stalked pycnidia, and a green photobiont. Mostly epiphytic, sometimes terricolous or muscicolous.

Diagnostic characters — *Cetraria subalpina* can be distinguished by its (1) smooth, flat, dichotomously-branched, elongate lobes, (2) absence of soredia and isidia, (3) marginal pycnidia on finger-like projections, (4) inconspicuous, submarginal pseudocyphellae, and (5) distinctive habitat on the bases of trees and ericaceous shrubs in montane to subalpine forests.

Description

THALLUS — medium-sized, foliose; lobes elongate, dichotomously branched (0.5) 2–3 (5) cm long and (0.5) 2–5 (6.5) mm wide, flat to weakly channeled, glabrous, forming shrubby cushions of tangled laciniae; upper surface variable in color, pallid to olivaceous-green or brown; medulla white; lower surface paler than upper surface. —soredia and isidia absent. —rhizines sparse to absent. —cilia short marginal projections irregularly produced. —pseudocyphellae submarginal, whitish, inconspicuous or sometimes absent. —pycnidia usually present, marginal, isidioid in appearance. —photobiont green (*Trebouxia*).

APOTHECIA — common when epiphytic, otherwise occasional, marginal, thalline, disk light brown, (1) 2–5 (8) mm, margin prominent at first and diminishing with age; paraphyses simple, unbranched. —asci subcylindrical, 8-spored, almost uniseriately arranged. —spores subspherical to globose, 3.5–6 × 3.5–5 μm.

CHEMISTRY — spot tests negative.

Ecology — *Cetraria subalpina* occurs mostly on the lower branches of ericaceous shrubs, such as manzanita, and tree bases, sometimes terricolous or muscicolous in open to semi-open forests in montane to subalpine habitats. It is rarely found in true alpine or middle to low elevations.

Distribution — *Cetraria subalpina* is known from North America. In western North America, *C. subalpina* is known from Alaska, British Columbia, Alberta, Washington, Oregon, Idaho, and Montana. In Oregon, *C. subalpina* is reported from Clackamas, Lane, and Linn counties within the West Cascades ecoregion.

Similar species — *Cetraria ericetorum* has more deeply channeled and wrinkled lobes. *Cetraria islandica* has conspicuous laminal pseudocyphellae on the lower surface. Both species are typically terricolous.

References — Kärnefelt et al. (1993), Kärnefelt (1979), Imshaug (1950).

References with color photos — McCune and Geiser (2009, p. 63), Brodo et al. (2001, p. 696).

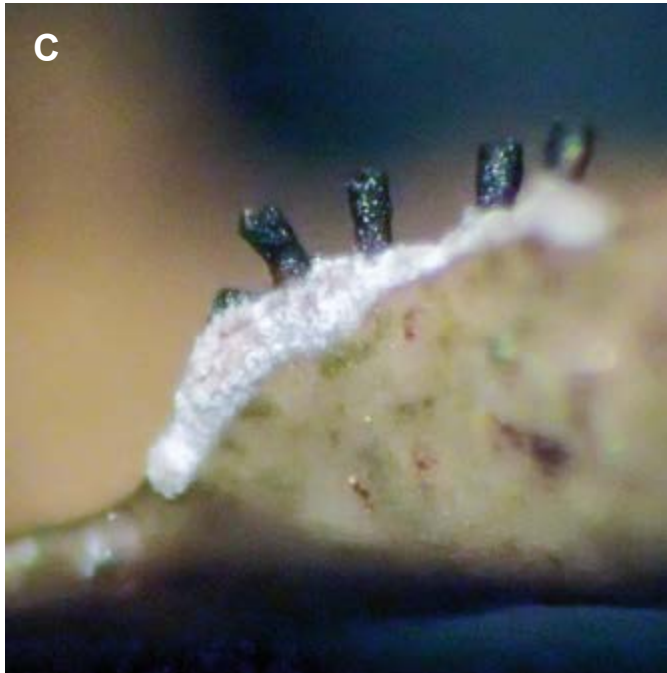


Plate 3. *Cetraria subalpina*. A. Thallus. B. Thallus with marginal pycnidia. C. Marginal pycnidia and pseudocyphellum. D. Thallus. (A–D: Loring Pers. Coll.)

Circinaria rogeri (Sohrabi) Sohrabi

Recent synonyms:

Aspicilia rogeri Sohrabi.

Aspicilia fruticulosa (Eversmann) Flagey (misapplied in North America)

Common name: manna lichen

FIELD SUMMARY — A vagrant and subfruticose lichen with pseudocyphellae on upper branches and a green photobiont. Terricolous.

Diagnostic characters — *Circinaria rogeri* can be distinguished by its (1) vagrant habit, (2) conspicuous pseudocyphellae at branch apices, and (3) apical pycnidia.

Description

THALLUS — yellowish-green, olive-green, olive-brown, or grayish-green, subfruticose, dichotomously to irregularly branched, forming free, shrubby, spherical to elongated lumps, 0.5–2.0 × 0.5–1.5 (2.5) cm broad; branches compact, cylindrical, short to elongated; apices blunt. —soredia and isidia absent. —rhizines and cilia absent. —pseudocyphellae pale, white, on upper branches and branch apices. —pycnidia occur as black spots on branch apices, common. —photobiont green (chlorococcoid).

APOTHECIA — rare, aspicilioid when young, maturing adnate to stipitate, up to 1.5 (2.5) mm, developing on wider parts of main branches; disk black to brown-black, usually pruinose, concave to slightly convex, occasionally divided by white strands; thalline margin flat to round, more or less elevated, prominent in older apothecia, entire, concolorous with thallus or with a thin to thick white rim. —asci broadly clavate, *Aspicilia*-type, 2–4 (5)-spored. —spores hyaline, globose to subglobose, 21.2–28.2 × 18.8–23.2 μm.

CHEMISTRY — medulla and cortex K-, C-, KC-, P-, I-. Sohrabi et al. (2011) reports a K+ red medulla reaction in some North American material.

Ecology — *Circinaria rogeri* is known from calcareous soils in shrub steppe lands with sagebrush (*Artemisia* spp.) at 3,000 to 6,000 feet in elevation. It favors habitats which are moist in the winter and spring, but dry out by summer.

Distribution — *Circinaria rogeri* is endemic to western North America where it is known from Oregon, Idaho, Montana, Nevada, Utah, Wyoming, and Colorado. In Oregon, *C. rogeri* is reported from Grant, Harney, Malheur and Wallowa counties within the Blue Mountain and Northern Basin and Range ecoregions.

Similar species — *Circinaria hispida* is similar to *C. rogeri*, and is often found in the same habitat. However, *C. hispida* is typically attached to the substrate, not truly vagrant, and can be distinguished by the pointed black apices of small branches and rounded to elongate white-spotted pseudocyphellae on the branches for most of their length. Furthermore, pycnidia of *C. hispida* are rare and found along the length of the branches. Though appearing fruticose and found in the same habitat as *C. rogeri*, vagrant species of *Xanthoparmelia* and vagrant forms of *Dermatocarpon* have well-differentiated upper and lower lobe surfaces. *Dermatocarpon* have perithecia instead of apothecia. Sohrabi et al. (2011) propose *Circinaria fruticulosa* to be excluded from North American checklists, at least temporarily.

References — Sohrabi et al. (2013), Sohrabi et al. (2011).

References with color photos — Sohrabi (2011), McCune and Geiser (2009, p. 28, as *Aspicilia hispida*), McCune and Rosentreter (2007, p. 52, as *Aspicillia hispida* and *A. fruticulosa*), Rosentreter et al. (2007, p. 45, as *A. fruticulosa*), Brodo et al. (2001, p. 169, as *Aspicilia hispida*, after 4th printing as *A. fruticulosa*).

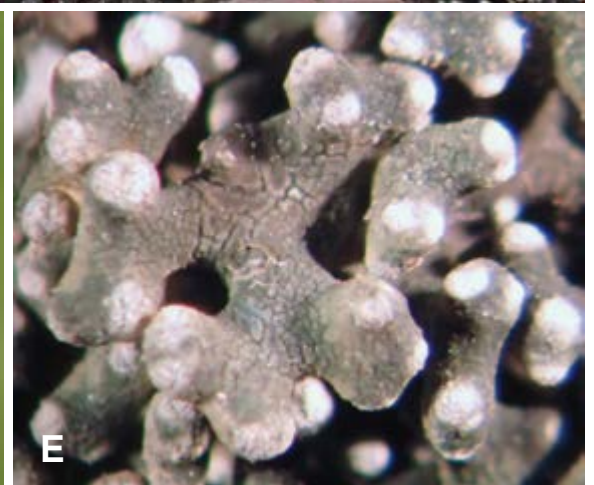
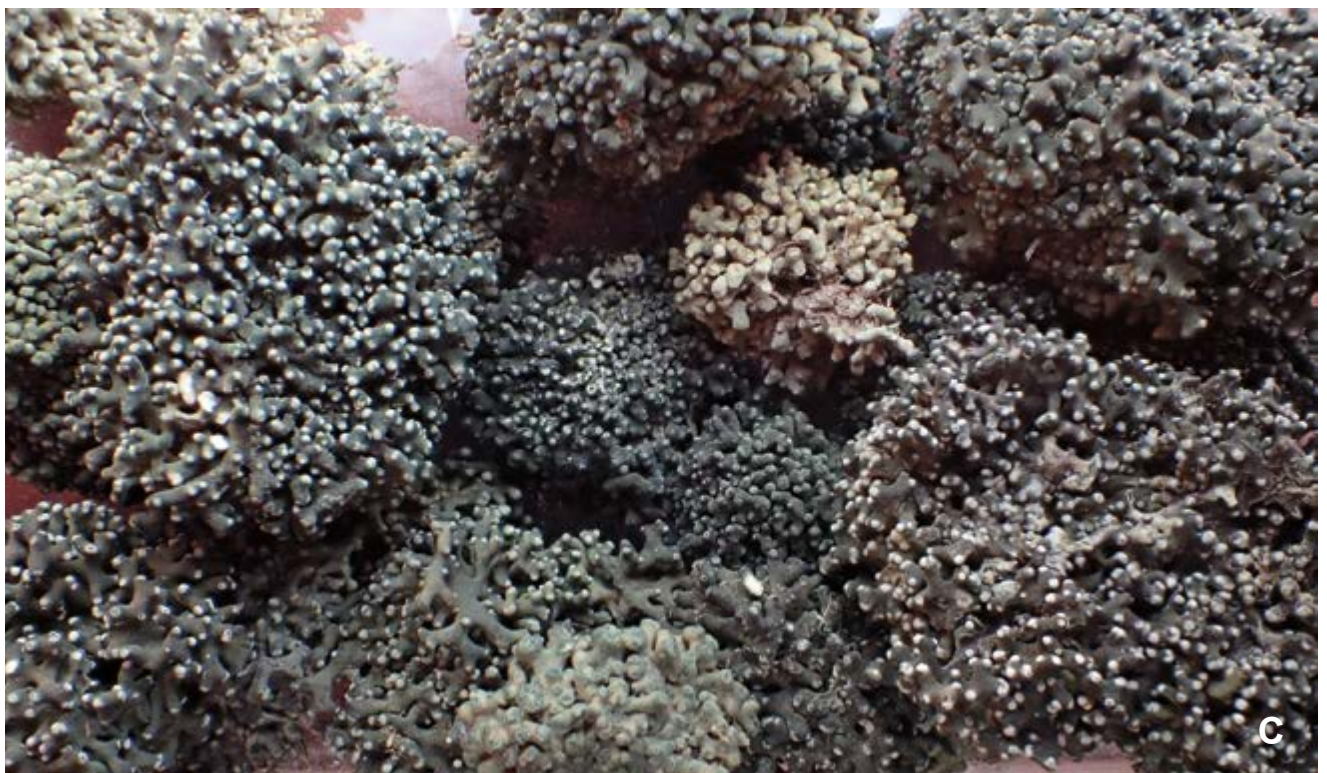


Plate 4. *Circinaria rogeri*. A–D. Thalli, E. Apical pycnidia. (A–B: McCune #22685, C–E: Rosentreter #3516)

Cladonia concinna Ahti and Goward

Recent synonym: none

Common names: elegant pixie cup, slender ladder lichen, ballerina lichen

FIELD SUMMARY — A coastal lichen consisting of a squamulose primary thallus and a secondary erect, hollow, esorediate podetium of tiered cups, with a green photobiont. Terricolous and muscicolous.

Diagnostic characters — *Cladonia concinna* can be distinguished by its (1) lack of soredia, (2) long, slender, vertically tiered podetia, proliferating centrally, and (3) habitat of sandy soil near the coast.

Description

THALLUS — of two types. Primary thallus of squamules that are sparse, inconspicuous and narrow, 4–5 × 1.0 mm; upper surface dark brown; lower surface white to bluish. Secondary thallus of fruticose, hollow, gray-green to brownish, matte podetia of slender, unbranched, vertically tiered cups proliferating from the center of the cup beneath, 2–7 cm tall, 0.5–1.0 mm thick; cups 1–3 (5) mm wide, 1.5–2 (3) mm high, becoming dentate and consistently produced at apices, tiered 4–7 times, usually with one central proliferation per tier, rarely proliferating marginally or with 2–5 proliferations per tier, corticate and smooth. —soredia absent. —pycnidia on cup margins and lining the cup. —photobiont green (*Trebouxia*).

APOTHECIA — inconspicuous reddish-brown bumps on cup margins. —spores not observed.

CHEMISTRY — thallus K-, KC-, C-, P-.

Ecology — In British Columbia, *Cladonia concinna* is known from open rock outcrops in coastal forests. It is also known from soil in open habitats, such as power lines, road banks, and a mossy hummock in an open bog, but not on wood. In California and Oregon, it is known from coastal sand dune and deflation plains at elevations below 600 feet.

Distribution — *Cladonia concinna* is known from North America. In western North America, *C. concinna* is known from British Columbia, Washington, Oregon, and California. In Oregon, *C. concinna* is reported from Douglas and Lane counties within the Coast Range ecoregion.

Similar species — *Cladonia verticillata* is similar but has shorter and broader cups up to 11 mm wide, which become stout when mature.

References — Ahti (2007), Van Herk and Aptroot (2003).

References with color photos — Sharnoff (2014, p. 160).



Plate 5. Cladonia concinna. A–B. Podetia. C. Central proliferations. D. Podetia.
(A–B: McCune #30985, C–D: McCune #22095)

Cladonia poroscypha S. Hammer

Recent synonym: none

Common name: perforate pixie cup

FIELD SUMMARY — A primarily coastal lichen consisting of primary basal squamules and a secondary erect, hollow podetium that lacks defined cups, with a green photobiont. Terricolous, saxicolous and muscicolous.

Diagnostic characters — *Cladonia poroscypha* can be distinguished by its (1) lack of cups, (2) deep yellow to orange medullary P reaction, (3) lack of soredia, (4) podetia branched 2–8 times from perforate axils, and (5) punctate, symmetrical perforations that do not become deformed or enlarged and are not triangular in shape.

Description

THALLUS — of two types. Primary thallus of squamules that are rarely persistent, to 7 mm long and 3 mm wide, ascending; upper surface olive colored. Secondary thallus of fruticose, hollow, sparingly branched podetia (6) 14–28 (45) mm tall, 0.5–2.0 mm wide, perforate at the axils and apices or rarely laterally, grayish, browning at the tips, uniformly slender, lacking defined cups, with a continuous cortex. —soredia absent. —pycnidia brown, cylindrical, either minutely stipitate or sessile on margins of perforations. —photobiont green (*Trebouxia*).

APOTHECIA — apical on branch proliferations, brown, flat. —asci 8-spored. —spores simple, hyaline, oblong-ellipsoid, 8–14 × 2.5–5 µm.

CHEMISTRY — cortex K-; medulla K+ strong yellow, KC+ yellow, P+ deep yellow to orange, UV-.

Ecology — *Cladonia poroscypha* is known from soil and rock, often amongst bryophytes in maritime habitats, including sandstone and other rock outcrops at low to middle elevations. In Oregon, *C. poroscypha* has been reported further inland than would be expected, at 1,650 feet in elevation. These sites occur in an Oregon white oak woodland and a mixed coniferous and hardwood forest consisting of Oregon white oak, madrone, and Douglas-fir.

Distribution — *Cladonia poroscypha* is known from North America. In western North America, *C. poroscypha* is known from British Columbia, Washington, Oregon, and California. In Oregon, *C. poroscypha* is reported from Douglas County within the Klamath Mountains ecoregion.

Similar species — *Cladonia artuata* and *C. japonica* are similar and occur in similar habitats along the coast. However, *C. japonica* has regular to oblique cups and *C. artuata* has open axils with perforations that become enlarged, deforming and tearing when apothecia are present. It is unbranched except from marginal cup proliferations. Additionally, *C. artuata* appears to have very specific habitat requirements and according to Hammer (1995) is found on stabilized sand dunes or on acidic, lateritic hardpan soils and is commonly found growing in thick clumps on duff under manzanita. *Cladonia squamosa* var. *subsquamosa* has abundant podetial squamules, axillary perforations that are punctate, triangular, or occasionally gaping, and branches and podetia that are not particularly narrow. *Cladonia poroscypha* has narrower, subulate branches less than 2 mm wide which often lack apothecia, and perforations that are consistently narrow and remain symmetrical in the presence of apothecia, not deforming or tearing.

References — McCune and Geiser (2009, p. 77), Brodo and Ahti (1996, Table 1), Hammer (1995), Hammer (1993).



Plate 6. *Cladonia poroscypha*. A. Podetia. B. Podetium with perforate axil. (A–B: McCune #30984)

Cladonia prolifica S. Hammer and Ahti

Recent synonym: none

Common name: proliferating pixie cup, phantom pixie cup

FIELD SUMMARY — A coastal lichen consisting of primary squamules and a secondary erect, hollow podetium of marginally proliferating, irregular cups, with a green photobiont. Terricolous or saxicolous.

Diagnostic characters — *Cladonia prolifica* can be distinguished by its (1) P+ red reaction, (2) absence of soredia, (3) narrow, oblique cups proliferating marginally, and (4) pale, corticate, mostly unbranched podetia not blackening at the base, usually lacking squamules.

Description

THALLUS — of two types. Primary thallus of squamules that are often evanescent, 2–8 mm long and 0.5–4 mm wide, strongly ascending to curled over; upper surface glaucescent green, becoming yellowish-brown to olive-brown, entire or crenulate, rarely deeply incised. Secondary thallus of fruticose, hollow podetia 15–35 mm tall and 1–4 mm wide, usually unbranched but proliferating repeatedly from narrow, oblique, irregular cup margins, greenish to bronze or yellow to nearly white, with a persistent though not necessarily continuous cortex, basally smooth to verruculose above, not granular, podetial squamules sparse or lacking; cups 1.5–5 mm across, flat, irregular, with crispate margins. —soredia absent. —pycnidia on cup margins, brown-black when mature, constricted at base, 0.5–1.0 mm. —photobiont green (*Trebouxia*).

APOTHECIA — capitate, dark reddish-brown, 1–3 mm. —asci 8-spored. —spores simple, hyaline, 3.5–5.5 × 11.5–20 μm, oblong-ellipsoid to spindle-shaped.

CHEMISTRY — thallus K- or K+ dingy yellow or brownish, KC-, P+ red, UV-.

Ecology — *Cladonia prolifica* is known from thin, acidic soil and dunes in open to somewhat sheltered hypermaritime habitats, rarely inland at humid localities.

Distribution — *Cladonia prolifica* is known from North America and Eurasia. In western North America, *C. prolifica* is known from British Columbia, Washington, Oregon, California, and Idaho. In Oregon, *C. prolifica* is reported from Coos, Lincoln, and Tillamook counties within the Coast Range ecoregion.

Similar species — *Cladonia phyllophora* is similar but has fewer, if any, proliferations on the cups, a more developed cortex, and podetia with darker (often blackened) bases. *Cladonia phyllophora* also turns black when senescent while *C. prolifica* does not.

References — Goward (1999, p. 154), Brodo and Ahti (1996), Hammer (1995), Hammer and Ahti (1990).



Plate 7. *Cladonia prolifica*. A. Podetia with apothecia. B–C. Podetia. (A: McCune #29801, B–C: McCune #29874)

Collema curtisporum Degelius

Recent synonym: none

Common name: jelly lichen

FIELD SUMMARY — A gelatinous, non-stratified foliose lichen lacking isidia. Epiphytic.

Diagnostic characters — *Collema curtisporum* can be distinguished by its (1) lack of isidia, (2) thin, often ridged thallus, (3) lack of a cortex, and (4) short fusiform spores usually with 3 septa.

Description

THALLUS — foliose, gelatinous, olivaceous-black when wet, up to 4 cm in diameter; lobes broadly rounded, up to 0.1 mm thick; upper surface pustulate to ridged. — isidia absent. — photobiont cyanobacteria (*Nostoc*).

APOTHECIA — common, scattered, to 1.5 mm, flat to convex; disk brown with a thin thalline margin. — spores hyaline, fusiform, often curved, usually 3-septate, $26\text{--}34 \times 1$ (1.5) μm . McCune and Geiser (2009) report larger spores, $20\text{--}40 \times 3\text{--}4.5$ μm , than Jørgensen (2012).

CHEMISTRY — spot tests negative.

Ecology — *Collema curtisporum* is usually found on black cottonwood bark in cool, damp habitats in mixed forests, between the crest of the Cascade Mountains and east to the crest of the Rocky Mountains.

Distribution — *Collema curtisporum* is known from Europe and North America. In western North America, *C. curtisporum* is known from Alaska, Washington, Oregon, Idaho, and Montana. In Oregon, *C. curtisporum* is reported from Jefferson, Linn, Umatilla, and Wallowa counties within the Blue Mountains and West Cascades ecoregions.

Similar species — *Collema* and *Leptogium* are similar gelatinous, non-stratified lichen genera with septate spores. *Collema* has a more olivaceous to black, pulpy thallus without a distinct cortical layer and exhibits significant swelling when wet. *Leptogium* is somewhat shiny in appearance and has a cellular cortex composed of roundish or isodiametric cells. *Collema nigrescens* is similar but has longer spores ($50\text{--}90 \times 3\text{--}4$ μm) with 4–12 septa, often has isidia, and is usually found west of the crest of the Cascade Mountains. *Collema furfuraceum* has isidia.

References — Jørgensen (2012, p. 20), McCune and Geiser (2009, p. 107).

References with color photos — Nordic Lichen Flora (2012, p. 173).

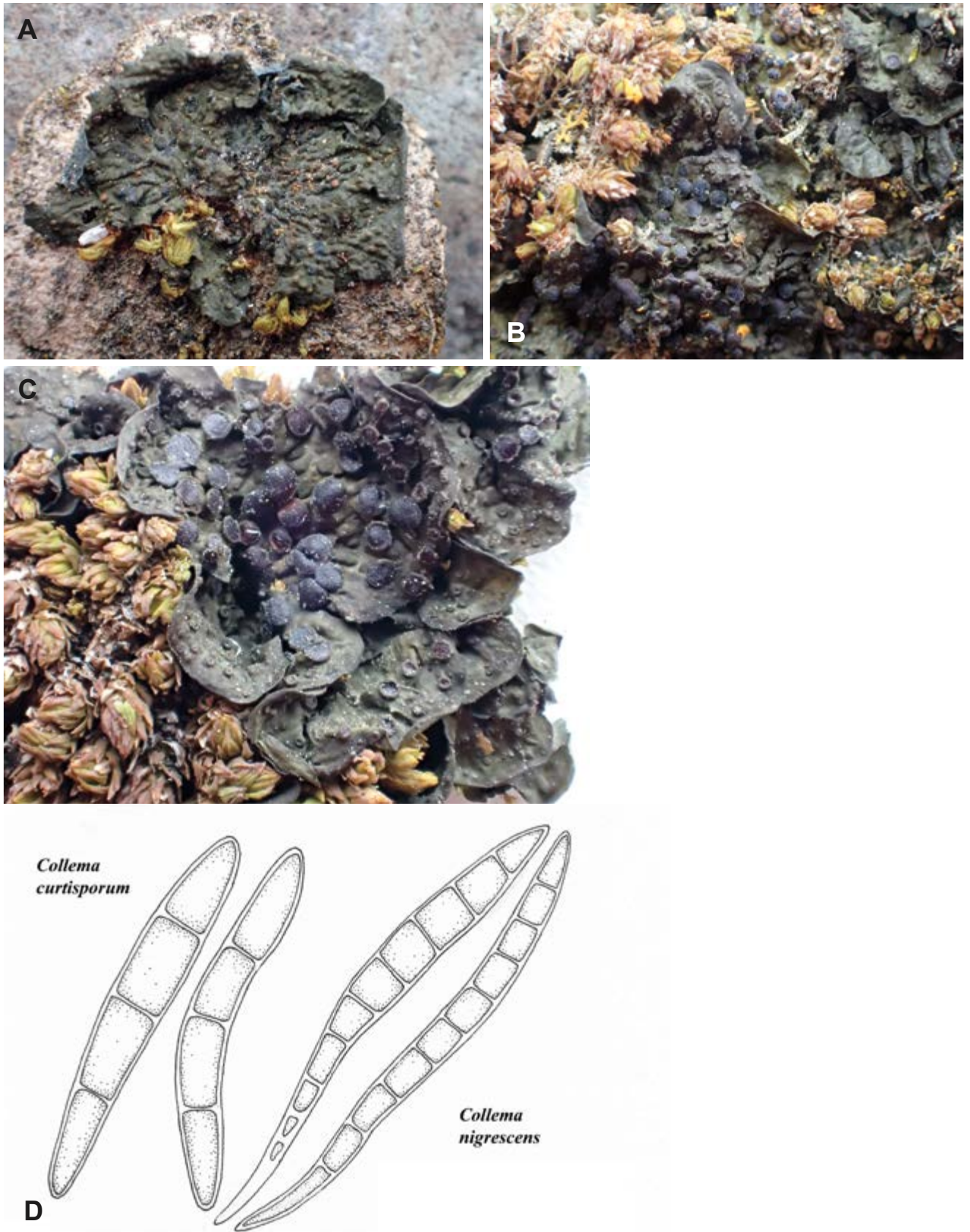


Plate 8. *Collema curtisporum*. A–C. Thallus. D. *Collema curtisporum* and *Collema nigrescens* spores. (A–C: McCune #9132.)

Collema quadrifidum D.F. Stone and McCune

Recent synonyms: none

Common names: jelly lichen

FIELD SUMMARY — A gelatinous, non-stratified foliose lichen lacking isidia. Epiphytic.

Diagnostic characters — *Collema quadrifidum* can be distinguished by its (1) small size, (2) lack of isidia, (3) quadrate spores, (4) lack of a cortex, and (5) epiphytic habitat on hardwoods.

Description

THALLUS — gelatinous, foliose, olivaceous in shady habitats to dark brown or black in exposed habitats, minutely ornamented, portions appearing stretched and nearly smooth, irregularly shaped, to 3.5 mm in diameter; lobe margins rounded, 1.5 mm wide, 225 μm thick; interior comprised of long, loose hyphae and chains of *Nostoc*. —isidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — common, reddish-brown, 0.6 mm wide, initially sunken, partially immersed when mature. —asci 8-spored. —spores quadrate, 12.5–15 μm .

CHEMISTRY — spot tests negative.

Ecology — In western Oregon, *Collema quadrifidum* is found on bark of hardwoods, including Oregon white oak, California black oak, and Pacific madrone. It occurs in mesic to more often xeric habitats ranging from oak savanna to mixed conifer and hardwood forests at elevations between 1,440 to 2,760 feet. In eastern Oregon, *C. quadrifidum* is epiphytic on large black cottonwood trees.

Distribution — *Collema quadrifidum* is known from North America. In western North America, *C. quadrifidum* is known from British Columbia, Washington, Oregon, and California. In Oregon, *C. quadrifidum* is reported from Douglas, Jackson, Josephine, and Umatilla counties within the Blue Mountains, Klamath Mountains, and West Cascades ecoregions.

Similar species — In the Pacific Northwest, the quadrate spores of *Collema quadrifidum* are distinctive. *Collema occultatum* has submuriform spores but in general these are larger (13–22 \times 9–15 μm) and more “rectangular” than “square,” with multiple transverse septa and one or two longitudinal septa. *Collema quadrifidum* can appear similar to young, small specimens of *C. nigrescens* and other *Collema* spp. However, *C. quadrifidum* reaches maturity at a small thallus size, bearing apothecia, whereas immature thalli of other *Collema* spp. usually do not bear apothecia. See *Collema curtisporum* for additional information on similar species.

References with color photos — Stone and McCune (2010).

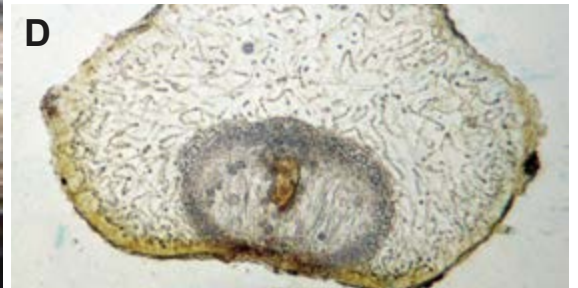


Plate 9. *Collema quadrifidum*. A–B. Thalli. C. Quadrate spore. D. Oblique cross-section of thallus and immersed apothecium. (A–D: Loring Pers. Coll.)

Collema undulatum var. *granulosum* Degelius

Recent synonyms: none

Common names: jelly lichen, jelly flakes

FIELD SUMMARY — A gelatinous, non-stratified foliose lichen with isidia. Saxicolous, muscicolous.

Diagnostic characters — *Collema undulatum* var. *granulosum* can be distinguished by its (1) dark coloration, (2) numerous isidia, (3) undulate, often ascending lobe margins making the lobes appear concave, (4) lack of a cortex, and (5) growth on calcareous rock.

Description

THALLUS — gelatinous, dark olive-green to black, more or less translucent when moist, smooth, not or only slightly glossy, foliose, rounded, deeply and broadly lobate; lobes 2–4 mm wide, 140–300 µm thick, imbricate, concave or ascending. — isidia numerous, globular, laminal, occasionally elongated and scale-like, 0.1–0.2 mm wide, concolorous with thallus. — photobiont cyanobacteria (*Nostoc*).

APOTHECIA — laminal or marginal, 0.5–1.5 mm, sessile with constricted base, plane, maturing to convex, red-brown or dark red, smooth, slightly glossy, epruinose; thalline margin more or less smooth. — spores hyaline, oblong, straight with rounded or obtuse ends, 3-septate, more or less constricted at the septa, 17–30 × 6.5–9 µm.

CHEMISTRY — spot tests negative.

Ecology — According to Jørgensen (2012), *Collema undulatum* var. *granulosum* is “terricolous or bryophilous, rarely on rocks” and suggests habitat for *C. undulatum* var. *undulatum* is on calciferous rock, mainly limestone. However, Schultz et al. (2004) in regard to *C. undulatum* var. *granulosum*, remark “on periodically moistened calcareous rocks, exceptionally on siliceous rocks or on mosses over rocks.” In Oregon, *C. undulatum* var. *granulosum* has only been found on calcareous rocks, often in seepy crevices or along driplines.

Distribution — *Collema undulatum* var. *granulosum* is known from Eurasia, Greenland, Iceland and North America. In western North America, *C. undulatum* var. *granulosum* is known from British Columbia, Oregon, Arizona, and Wyoming. In Oregon, *C. undulatum* var. *granulosum* is reported from Jackson and Josephine counties within the Klamath Mountains ecoregion.

Similar species — Jørgensen (2012) notes *C. undulatum* var. *granulosum* has densely compacted, laminal, globose isidia and has a more arctic-alpine distribution than *C. undulatum* var. *undulatum*. In addition, *C. undulatum* var. *granulosum* differs from other isidiate, terricolous taxa by the thick thallus and wavy lobe margins. Schultz et al. (2004) notes *Collema fuscovirens* is similar, but has a paler thallus that is slightly pustulate and less distinctly undulate, and has broadly ellipsoid or fusiform, submuriform spores. See *Collema curtisporum* for additional information on similar species.

References — Jørgensen (2012, p. 29), Schultz et al. (2004, p. 80).

References with color photos — Brodo et al. (2001, p. 288).

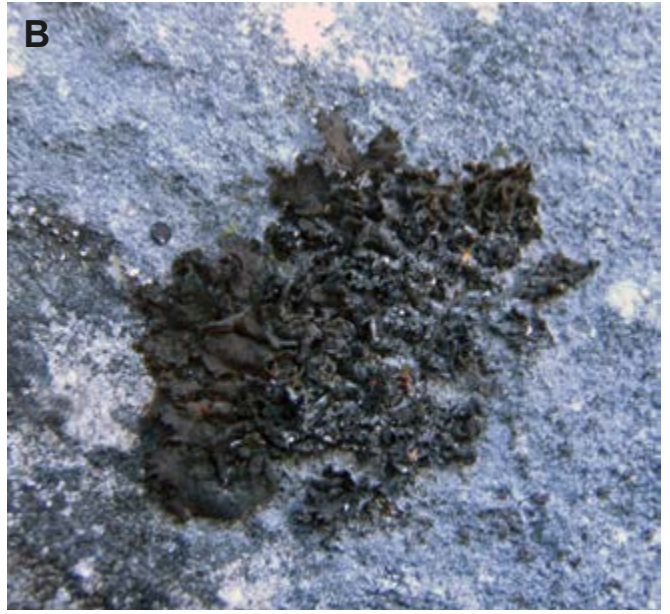
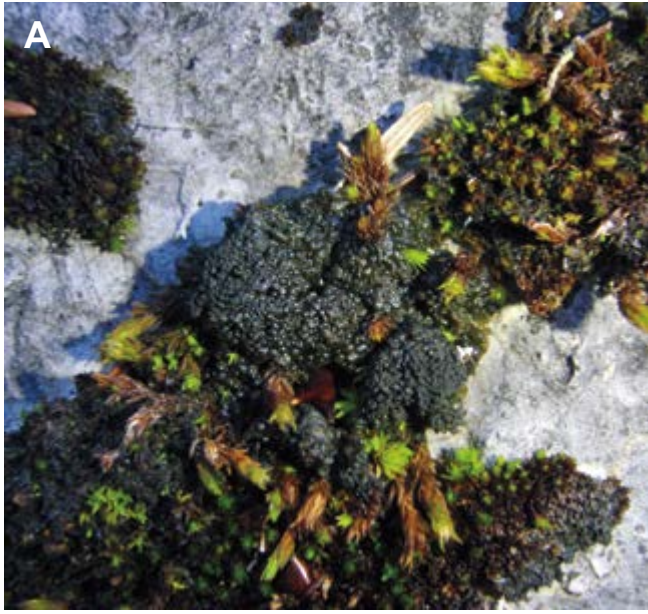


Plate 10. *Collema undulatum* var. *granulosum*. A. Thallus (wet). B. Thallus (dry). C. Globular isidia.
(A–C: Loring Pers. Coll.)

Dermatocarpon polyphyllizum (Nylander) Blomberg and Forssell

Recent synonym: none

Common name: stippleback lichen

FIELD SUMMARY — An umbilicate, foliose lichen with a green photobiont. Saxicolous.

Diagnostic characters — *Dermatocarpon polyphyllizum* can be distinguished by its (1) umbilicate, foliose habit with irregular secondary holdfasts, (2) paler lower surface when compared to the upper, lacking rhizines and papillae, (3) spores less than 15 μm , (4) positive reddish-brown medullary reaction when tested with Melzer's reagent, and (5) subalpine to alpine, saxicolous habitat generally near water.

Description

THALLUS — foliose, umbilicate, irregularly producing secondary holdfasts; lobes single or in rosettes 5–12 (19) mm broad, sometimes rosettes of smaller lobes 0.4–3 (6) mm wide, thallus thickness ranging from (100) 140–240 μm in areas lacking perithecia, to 260–420 μm in areas with perithecia; upper surface dark gray or dark gray-brown, often lightly gray pruinose, 60–120 μm thick; medulla 70–220 μm thick; lower surface paler than upper surface, lacking papillae, often partly reticulate. —soredia and isidia absent. —rhizines and cilia absent. —pycnidia rare, immersed. —photobiont green (*Myrmecia* and other unicellular algae).

PERITHECIA — common, pear-shaped to globose, 210–320 \times 180–300 μm , exciple hyaline to brown, immersed or emergent. — asci 8-spored. —spores simple, hyaline, broadly ellipsoid to ellipsoid, (8.5) 10–13.5 (16) \times (4.5) 5.5–7 (8.5) μm .

CHEMISTRY — thallus K-, KC-, C-, P-; medulla I+ reddish-brown in Melzer's reagent.

Ecology — *Dermatocarpon polyphyllizum* is saxicolous, particularly in seeps or located near water in alpine and subalpine habitats.

Distribution — *Dermatocarpon polyphyllizum* is known from Eurasia, North America and Antarctica. In western North America, *D. polyphyllizum* is known from British Columbia, Oregon, California, Montana, and Arizona. In Oregon, *D. polyphyllizum* is reported from Wallowa County within the Blue Mountains ecoregion.

Similar species — *Dermatocarpon miniatum* is similar, but has an I- medulla reaction. *Dermatocarpon cf. bachmannii* is distinguished by having longer spores (13) 16–20 (26) μm , and a darker lower surface compared to the upper surface. *Dermatocarpon meiohyllizum* has larger spores, (11) 14–18 (21) \times (5) 6–8 (10.5), often turns green when wet, and has a papillate lower surface that is generally darker than the upper surface.

References — McCune and Geiser (2009, p. 115), Heiðmarsson and Breuss (2004, p. 91), Heiðmarsson (2001), Orange (1998).

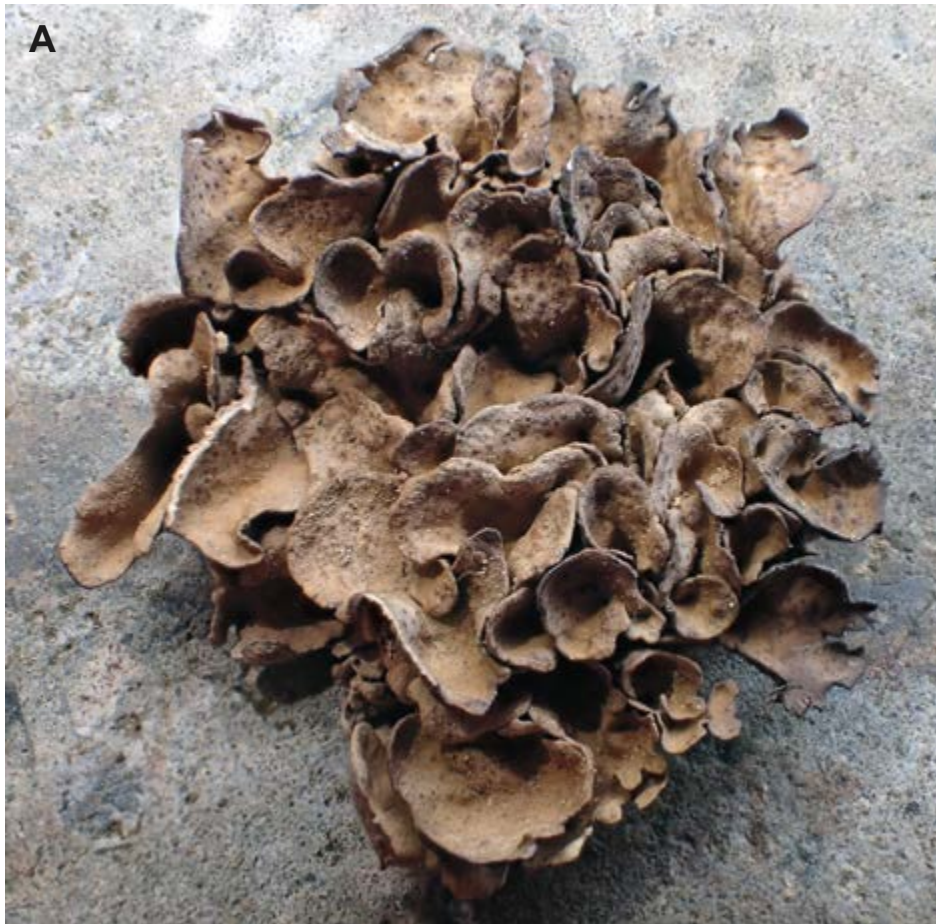


Plate 11. *Dermatocarpon polyphyllizum*. A. Thallus. B. Underside of thallus. (A–B: McCune #20685)

Ephebe solida Bornet

Recent synonym: none

Common name: thread lichen, rockshag lichen

FIELD SUMMARY — An aquatic to semi-aquatic, filamentous, algal-like, fruticose lichen with a cyanobacterial photobiont. Saxicolous.

Diagnostic characters — *Ephebe solida* can be distinguished by its (1) filamentous habit, (2) short, stout thallus with uniform branching, (3) presence of paraphyses, (4) branches terminating with dense branchlets, appearing like a medieval mace, and (5) 8 spores per ascus.

Description

THALLUS — dwarf-fruticose, greenish-black to dark olive-brown, filamentous, forming tufts or rosettes; branches to 3 cm long and (100) 130–260 (300) μm thick. —soredia and isidia absent. —rhizines and cilia absent. —pycnidia present as swellings. —photobiont cyanobacteria (*Stigonema*).

APOTHECIA — minute, immersed, lateral, globose, 0.09–0.2 (0.4) mm, developing at pycnidial swellings. Paraphyses distinct to coherent-indistinct with somewhat thickened apices. —asci cylindrical-clavate, 8-spored. —spores hyaline, simple, oblong-ellipsoid, (10) 12–16.5 \times (4) 5.5–7 μm .

CHEMISTRY — spot tests negative.

Ecology — *Ephebe solida* is known from siliceous rocks in small streams and splash zones near rivers, lakes, and oceans. It is often found growing intermixed with colonies of free-living *Stigonema*.

Distribution — *Ephebe solida* is known from Eurasia and North America. In western North America, *E. solida* is known from British Columbia, Washington, Oregon, California, and Montana. In Oregon, *E. solida* is reported from Linn and Polk counties within the Coast Range and West Cascades ecoregions.

Similar species — *Ephebe lanata* is longer and lax, with loosely irregular dichotomous branching, and lacks paraphyses. In addition, the primary branches of *E. lanata* are thinner (60–140 (200) μm), than those of *E. solida*. *Ephebe brasiliensis* has thick branches, but has 16 spores per ascus, as does *E. multispora* and *E. hispidula*. Furthermore, *E. hispidula* has branchlets extending down the length of the branches.

References — Tuckerman (2013, p. 5), Brodo et al. (2001, p. 309), McCune and Goward (1995), Henssen (1963, p. 40), Fink (1935, p. 143).

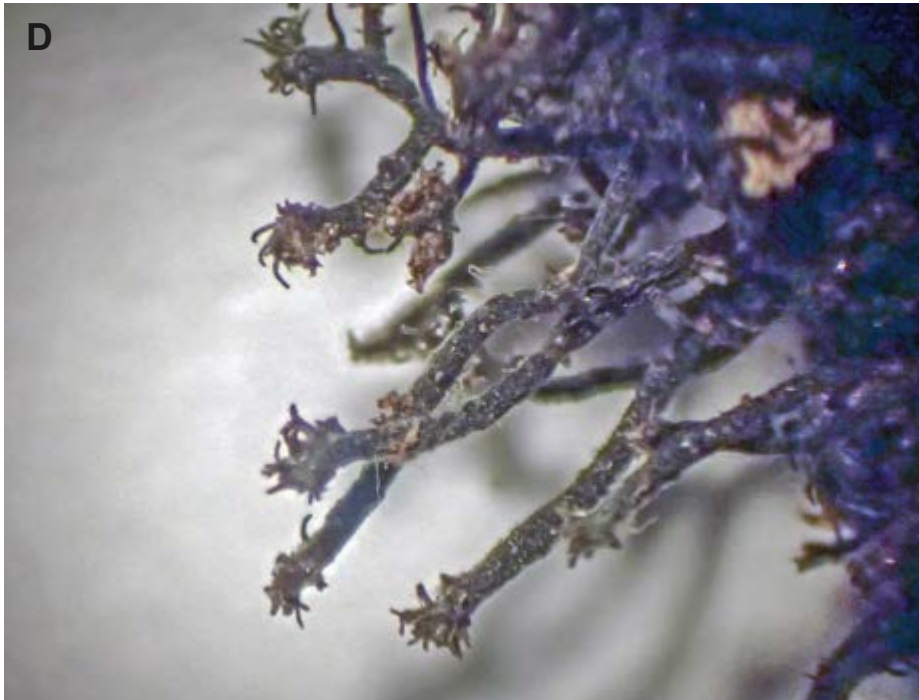
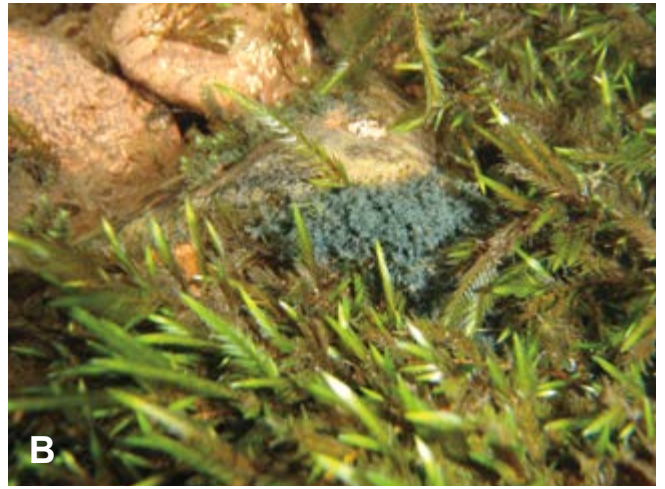
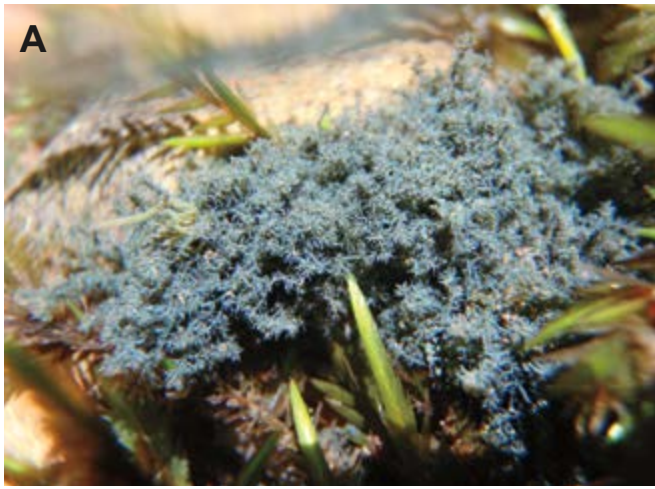


Plate 12. *Ephebe solida*. A. Thallus (wet). B. Habitat. C. Thallus (dry). D. Branch apices. E. Micrograph of branch apex. (A–E: Loring Pers. Coll.)

Fuscopannaria laceratula (Hue) P.M. Jørgensen

Recent synonym: none

Common name: lacerate shingle lichen

FIELD SUMMARY — A squamulose to small-foliose lichen with flattened lobes and a cyanobacterial photobiont (*Scytonema*-like). Mostly epiphytic, occasionally terricolous or muscicolous.

Diagnostic characters — *Fuscopannaria laceratula* can be distinguished by its (1) small squamulose to foliose thallus with flattened, strap-shaped (ligulate) lobules, (2) distinct black prothallus, (3) P- thallus chemistry, (4) *Scytonema*-like photobiont, and (5) spore size less than 25 μm .

Description

THALLUS — squamulose, to 1 (2) mm broad, deeply incised, usually with ligulate lobules, forming extensive colonies over substrate, prothallus distinct, black. —soredia and isidia absent. —lobules brown or gray, highly variable, elongate, flattened, often ligulate at margins and can be so incised as to appear coralloid, arising from the lower surface and edges of the thallus. —rhizines and cilia absent. —pycnidia absent. —photobiont *Scytonema*-like cyanobacteria with large (to 10 μm) green cells in short chains.

APOTHECIA — common, immersed, becoming sessile, 1.5 mm in diameter, reddish-brown to dark brown with a thalline margin (sometimes emarginate), margin becoming squamulose. —asci with a blue-staining apical ring. —spores often poorly developed, simple, ellipsoid, (12) 15–20 (23) \times 7–9 μm .

CHEMISTRY — thallus P-; hymenium I+ blue-green turning red-brown.

Ecology — *Fuscopannaria laceratula* is epiphytic on conifers, sometimes hardwoods (alders and willows), and occasionally on mossy rocks or soil, usually near the coast.

Distribution — *Fuscopannaria laceratula* is known from Asia and North America. In western North America, *F. laceratula* is known from Alaska, British Columbia, Washington, and Oregon. In Oregon, *F. laceratula* is reported from Clatsop and Lane counties within the Coast Range ecoregion.

Similar species — *Fuscopannaria aurita* is distinguished by having lobules that are rounded rather than elongate, and by the presence of terpenoids, causing the formation of fine needle-like crystals on herbarium specimens. *Fuscopannaria triptophylla* has laminal lobules and isidia often obscuring the thallus. *Pannaria* is similar but has a P+ orange cortex and/or medulla and is often distinctly foliose.

References — McCune and Geiser (2009, p. 127), Jørgensen (2005), Jørgensen (2000).



Plate 13. *Fuscopannaria laceratula*. A. Thallus with coralloid appearance. B. Ligulate lobules. C. Thallus.
(A–C: Loring Pers. Coll.)

Heterodermia japonica (M. Satô) Swinscow and Krog

Recent synonym: none

Common name: Japanese fringed lichen, Japanese centipede lichen

FIELD SUMMARY — A greenish-white foliose lichen lacking a lower cortex, with marginal rhizines/cilia, labriform soralia and a green photobiont. Epiphytic and muscicolous.

Diagnostic characters — *Heterodermia japonica* can be distinguished by its (1) marginal cilia less than 2 mm long, (2) lack of a lower cortex, (3) labriform soralia often on lobe tips, and (4) marginal, elongate, whitish pseudocyphellae.

Description

THALLUS — foliose, to 5 cm broad, often forming loosely adnate colonies to 15 cm or more; lobes dichotomously branched, ascending and often widening toward the apices; upper surface greenish-white to whitish or cream-colored; medulla white; lower surface lacking a cortex, whitish to brown or violet-black, often sparsely spotted with orange-brown pigment. —soredia farinose to granular on lobe tips in labriform soralia —isidia absent. —rhizines/cilia marginal, usually less than 2 mm. —pseudocyphellae marginal, elongate, white. —pycnidia rare, immersed. —photobiont green (*Trebouxia*).

APOTHECIA — rare, laminal, thalline; disk dark brown and lightly pruinose. —spores brown, 1-septate, ellipsoid, 40–45 × 20–22 μm.

CHEMISTRY — cortex K+ yellow, C-, KC-, P+ yellow; medulla K+ yellow, C-, KC-, P- or P+ yellow; lower surface K-.

Ecology — *Heterodermia japonica* is known from conifer bark and mosses on rock in both shaded and exposed habitats below 2,000 feet in elevation. In Oregon, it is known from coastal headlands in Sitka spruce and western hemlock plant associations. According to Moberg and Nash III (2002), *H. japonica* is a highly variable species in both morphology and chemistry. In shaded habitats, lobes may be more elongated with longer marginal rhizines (up to 7mm). They also mention that *H. japonica* is probably the most common species of the genus in the Sonoran Desert region.

Distribution — *Heterodermia japonica* is known from Eurasia, North and South America, and Australia. In western North America, *H. japonica* is known from Alaska, Yukon Territory, British Columbia, Oregon, California, Arizona, Colorado, New Mexico, and Mexico. In Oregon, *H. japonica* is reported from Lane and Tillamook counties within the Coast Range ecoregion.

Similar species — *Heterodermia japonica* is distinguished from other *Heterodermia* species by the appressed or ascending short lobes, lack of a lower cortex, and labriform soralia on the lobe tips. *Heterodermia speciosa*, found in the same habitats, has a lower cortex. *Heterodermia leucomela*, frequent in the same habitats, also lacks a lower cortex, but is sorediate below, has longer cilia, and the lobes are long, strap-like and not adnate. *Heterodermia sitchensis* is distinguished by soredia in urn-shaped structures at the lobe tips. *Anaptychia* species are often darker in overall color, usually lack a lower cortex, and have a K- medulla and cortex.

References — Moberg and Nash III (2002, p. 212).

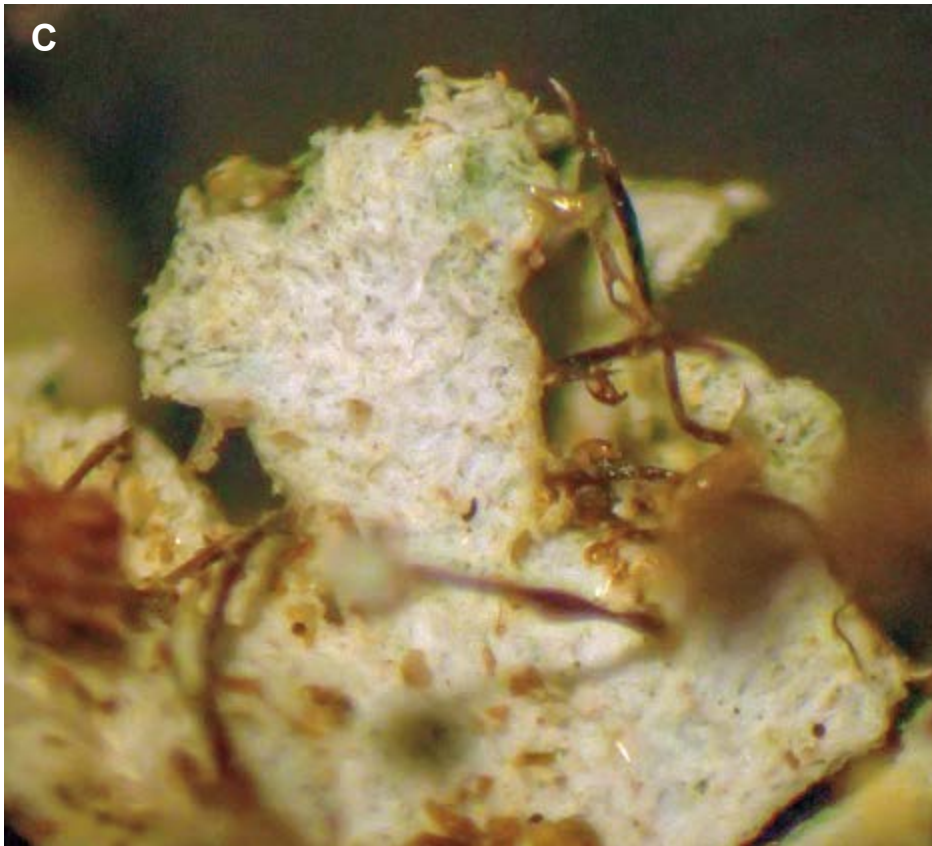


Plate 14. *Heterodermia japonica*. A. Thallus. B–C. Lower surface lacking a cortex. (A–C: Loring, Pers. Coll.)

Heterodermia sitchensis Goward and Noble

Recent synonym: none

Common name: Sitka fringed lichen, seaside centipede

FIELD SUMMARY — A greenish-white foliose lichen with marginal rhizines/cilia, lacking a lower cortex, with soralia in urn-shaped structures on lobe tips and a green photobiont. Epiphytic.

Diagnostic characters — *Heterodermia sitchensis* can be distinguished by its (1) lower cortex partially or wholly lacking, (2) thallus of short lobes with marginal rhizines/cilia, and (3) distinctive urn-shaped (excipular) soralia on lobe tips.

Description

THALLUS — diminutive, up to 2 cm broad, foliose, cushion-forming; lobes irregularly branched, to 2 mm wide, lobe margins with irregularly branching rhizines; upper surface greenish-white or pale greenish-gray discoloring to bluish-black, dull and smooth but sometimes with scattered bumps and ridges; lower cortex partially or completely lacking. —soredia present in urn-shaped soralia at lobe tips. —isidia absent. —rhizines/cilia marginal, irregularly branched, 0.5–2 mm. —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — occasional, becoming soredate on the margins, often aborting and developing urn-like structures that arise from thalline rim.

CHEMISTRY — cortex K+ yellow; medulla K+ yellow, C-, KC-, P+ yellow or orange.

Ecology — *Heterodermia sitchensis* is known from bark of Sitka spruce and is suspected to occur on other conifer species in cool, moist, hypermaritime environments.

Distribution — *Heterodermia sitchensis* is known from North America. In western North America, *H. sitchensis* is known from Alaska, British Columbia, and Oregon. In Oregon, *H. sitchensis* is reported from Douglas and Tillamook counties within the Coast Range ecoregion.

Similar species — *Heterodermia sitchensis* is distinguished from other *Heterodermia* species and from all other physcioid species by its urn shaped soralia and lack of a lower cortex. See *Heterodermia japonica* for a discussion on similar species.

References — Goward (1984).

References with color color photos — McCune and Geiser (2009, p. 139).

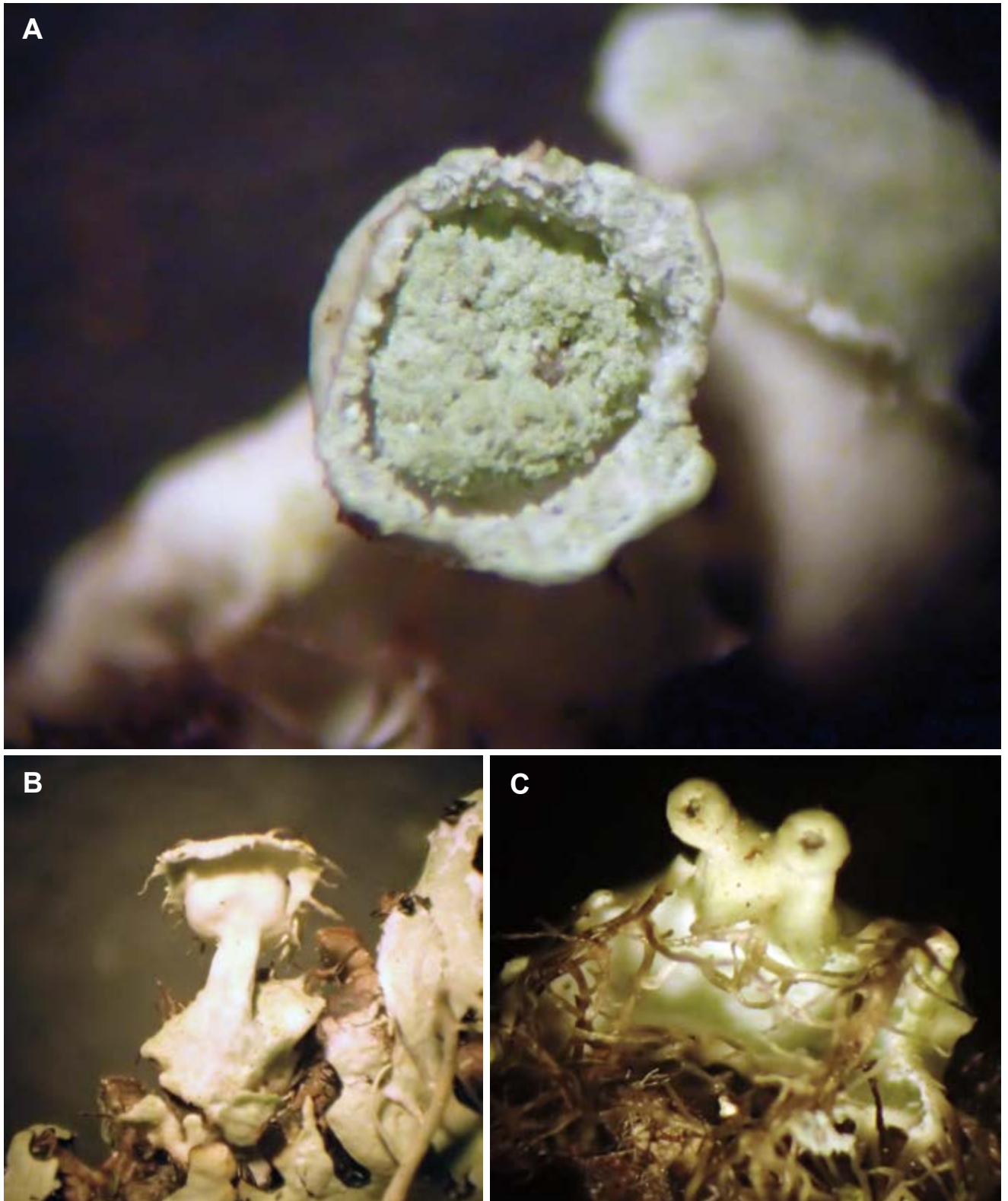


Plate 15. *Heterodermia sitchensis*. A. Urn-shaped soralium top view. B. Underside of urn-shaped soralium. C. Immature apothecia. (A–C: Loring, Pers. Coll.)

Heterodermia speciosa (Wulfen) Trevis

Recent synonyms: *Anaptychia speciosa* (Wulfen) A. Massalongo

Common name: powdered fringe lichen, powdered centipede

FIELD SUMMARY — A sorediate, greenish-white, foliose lichen with marginal rhizines/cilia and a green photobiont. Epiphytic, muscicolous, and saxicolous.

Diagnostic characters — *Heterodermia speciosa* can be distinguished by its (1) thallus of appressed or ascending short lobes, (2) cilia less than 2 mm, (3) labriform soralia, (4) presence of a lower cortex with abundant to sparse rhizines, and (5) overall bluish tinge, at least in Oregon material.

Description

THALLUS — foliose, 2–3 (4) cm forming colonies up to 15 cm in diameter, adnate, irregularly dichotomously lobate; lobes short, appressed or ascending, (0.5) 1–2 mm wide, flat to convex, slightly widening toward minutely notched apices; upper surface greenish-gray with a bluish tinge, otherwise white to cream-colored or brownish to bluish-gray, somewhat shiny, lobe-tips sometimes darkening, rarely pruinose; medulla white; lower surface white to pale brown, corticate but sometimes irregularly so, smooth but fibrous with parallel fibers. —soredia abundant, bluish-gray to gray, farinose to somewhat granular, in labriform soralia at lobe tips. —isidia absent. —cilia abundant in Oregon material, otherwise scattered on margins or lacking, short (less than 2 mm) and robust, pale to black, irregularly branched, sometimes extending from margins of ascending lobes and becoming a tangled mat beneath. —rhizines sparse to abundant on lower laminal surface, sometimes branched. —pycnidia not seen. —photobiont green (trebouxiioid).

APOTHECIA — rare, substipitate; disk brown to blackish-brown 3–8 mm. —asci cylindrical to clavate, 8-spored. —spores brown, 1-septate, ellipsoid, 30–37 × 14–18 µm.

CHEMISTRY — cortex K⁺ yellow, C⁻, KC⁻, P⁺ yellow; medulla K⁺ yellow, C⁻, KC⁻, P⁻ or P⁺ yellow.

Ecology — In Oregon, *Heterodermia speciosa* is known from twigs and small branches of Sitka spruce in hypermaritime forests. In British Columbia and northward, it is reported from hardwoods along the northern coast. In Europe, it is found on mossy rocks and boulders in damp environments and is rarely epiphytic. In the Sonoran Desert region it is recorded from sunny, moist rocks, or on tree trunks in humid habitats. Elsewhere it is found on both trees and rocks in older, humid, forests.

Distribution — *Heterodermia speciosa* is known from Eurasia, Africa, North and South America, and Australia. In western North America, *H. speciosa* is known from Alaska, Northwest Territories, British Columbia, Alberta, Oregon, Arizona, Utah, and Mexico. In Oregon, *H. speciosa* is reported from Tillamook County within the Coast Range ecoregion.

Similar species — See *Heterodermia japonica* for a discussion on similar species.

References — McCune and Geiser (2009, p. 137), Moberg and Nash III (2002, p. 218), Moberg (2002, p. 26).

References with color photos — Brodo et al. (2001, p. 340).

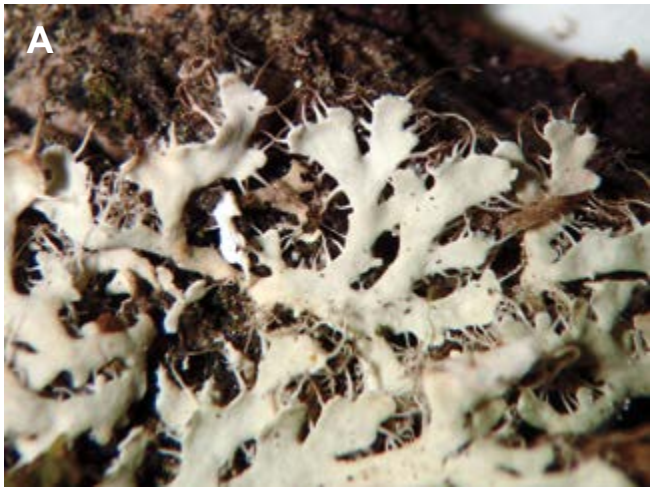


Plate 16. *Heterodermia speciosa*. A. Thallus. B. Lower surface with fibrous cortex. C. Thallus. D. Labriiform soralia (A: Esslinger #19158, B–C: Esslinger #10181, D: Esslinger #10152)

Hypogymnia pulverata (Nylander) Elix

Recent synonym: none

Common name: powdered tube lichen

FIELD SUMMARY — A solid, pale greenish-gray, sorediate, foliose lichen with a black lower surface and a green algal photobiont. Epiphytic.

Diagnostic characters — *Hypogymnia pulverata* can be distinguished by its (1) solid lobes and (2) laminal, granular soredia.

Description

THALLUS — foliose, 3–15 cm broad, overall has a distinctive trailing habit; lobes solid, sparingly branched, of two types. Primary lobes 2–3 mm, appressed. Secondary lobes narrow, 1–2 mm, ascending; upper surface pale greenish-gray, disintegrating into granular soredia; lower surface black, irregularly pitted, brown at the tips. —soredia laminal, granular, arising from disintegration of the upper cortex. —isidia absent. —rhizines and cilia absent. —pycnidia black. —photobiont green (*Trebouxia*).

APOTHECIA — rare, thalline, subpedicellate, with a flat or concave disk 3–12 mm, on a sorediate receptacle. —asci 8-spored. —spores simple, hyaline, ellipsoid.

CHEMISTRY — cortex K+ yellow; medulla K+ reddish-brown (slow), P- or P+ red, KC+ orange.

Ecology — *Hypogymnia pulverata* is known from bark and wood, especially conifers at low elevations along the eastern Pacific coast. Sites in Oregon are situated in Sitka spruce forests on the immediate coast. In Alaska, it is reported further inland within mature western hemlock forests.

Distribution — *Hypogymnia pulverata* is known from Eurasia, North and South America, and Australasia. In western North America, *H. pulverata* is known from Alaska, British Columbia, and Oregon. In Oregon, *H. pulverata* is reported from Tillamook County within the Coast Range ecoregion.

Similar species — *Hypogymnia imshaugii* is sometimes partially solid, but lacks soredia. Most other similar *Hypogymnia* consistently have hollow lobes.

References — Nelson et al. (2011), Elvebakk (2011), Brodo et al. (2001, p. 345).

References with color color photos — McCune and Geiser (2009, p. 156).

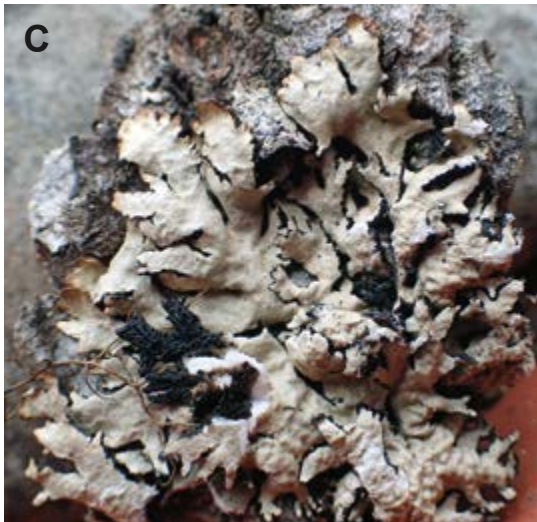


Plate 17. *Hypogymnia pulverata*. A. Thallus. B. Lobes with laminal soredia. C. Thallus. D. Irregularly pitted lower surface. (A–B: McCune #22844, C–D: Joneson #784c)

Hypogymnia subphysodes (Krempelhuber) Filson

Recent synonym: none

Common name: Austral bone lichen

FIELD SUMMARY — A hollow, pale greenish-gray, sorediate, foliose lichen with a black lower surface and a green algal photobiont. Epiphytic or saxicolous.

Diagnostic characters — *Hypogymnia subphysodes* can be distinguished by its (1) diverging, hollow lobes, (2) laminal soredia, (3) negative P reaction, and (4) separate lobes (vs. contiguous lobes forming appressed rosettes).

Description

THALLUS — foliose, 3 to 15 cm broad; lobes hollow, of two types. Primary lobes 2–8 mm wide, flattened and appressed to the substrate. Secondary lobes narrow, 0.5–3 mm wide, ascending, irregularly and sparingly branched; upper surface whitish-gray, 3–12 cm broad, with laminal soredia; lower surface black, irregularly pitted, brown at the tips. —soredia granular, irregular, initiating near lobe tips and spreading over laminal surface. —isidia occasional near lobe tips. —rhizines and cilia absent. —pseudopodia black, flask-shaped, semi-immersed. —photobiont green (*Trebouxia*).

APOTHECIA — stipitate, thalline; disk concave, reddish-brown, up to 5 mm, on a sorediate receptacle. —asci 8-spored. —spores simple, hyaline, ellipsoid, 7–10 × 4–6 μm.

CHEMISTRY — cortex K+ yellow; medulla KC+ red, P-, C-.

Ecology — *Hypogymnia subphysodes* is known from bark, wood, twigs, and rocks. *Hypogymnia subphysodes* usually occurs in humid forests and is common in the southern hemisphere. In Oregon, it occurs on shore pine in coastal dune habitat.

Distribution — *Hypogymnia subphysodes* is known from Asia, North and South America, and Australia. In North America, *H. subphysodes* is known only from Oregon in Lane County within the Coast Range ecoregion.

Similar species — *Hypogymnia subphysodes* could be mistaken for other sorediate *Hypogymnia* species. *Hypogymnia pulverata* has solid lobes. *Hypogymnia tubulosa* primarily has apical or subapical soredia and *H. oceanica* has a thallus entirely composed of narrow, appressed lobes less than 3 mm wide, a P+ red medulla reaction and laminal to terminal soredia. *Hypogymnia austerodes* has continuous, often brownish lobes forming rosettes and occurs from subalpine to alpine habitats in and east of the Cascade Mountains.

References — Elvebakk (2011).

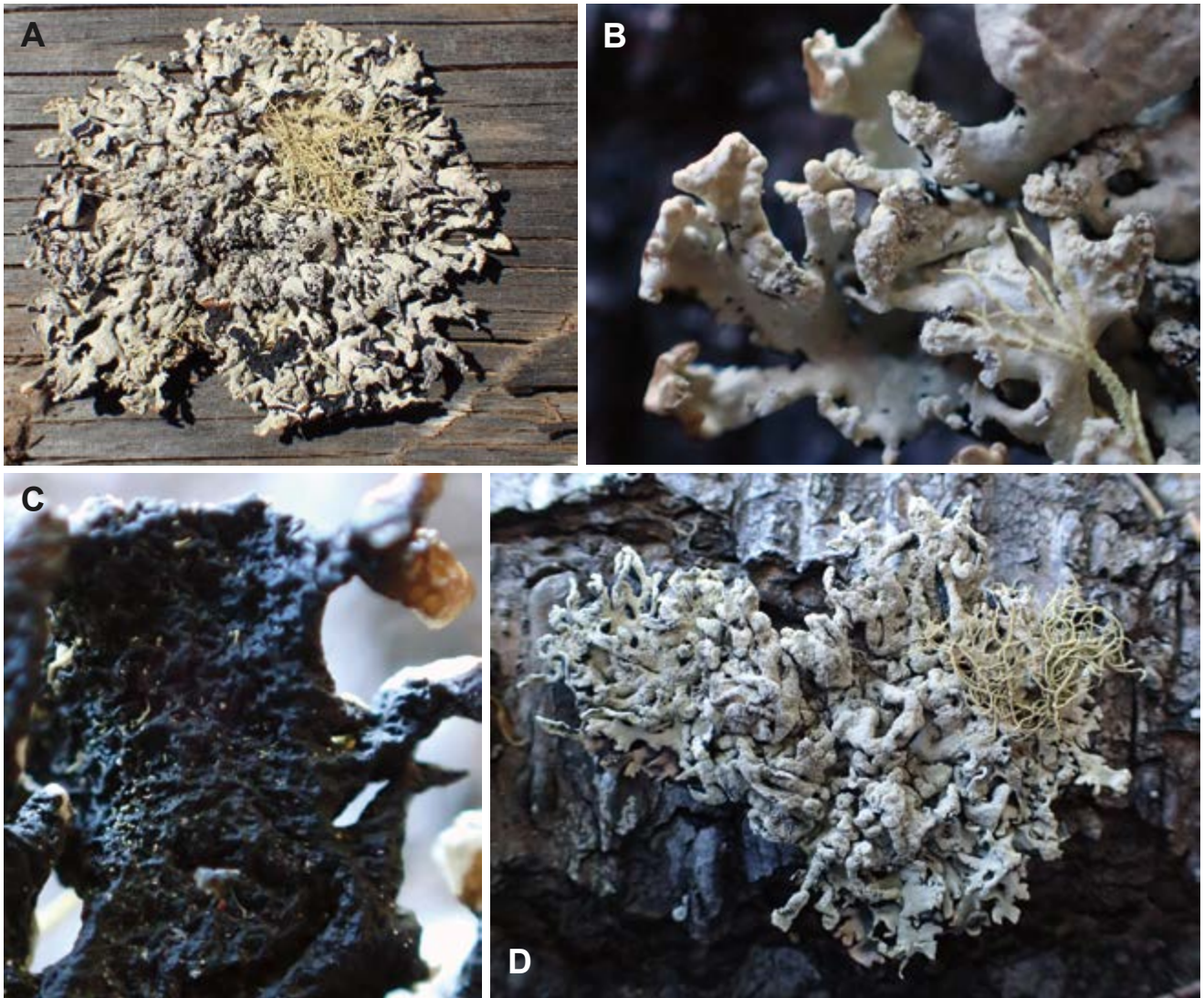


Plate 18. *Hypogymnia subphysodes*. A. Thallus. B. Sorediate lobe tips. C. Irregularly pitted lower surface. D. Thallus.
(A–D: McCune #27333)

Hypotrachyna revoluta (Flörke) Hale

Recent synonym: *Parmelia revoluta* Flörke

Common name: powdered loop lichen

Taxonomic note: McCune and Geiser (2009) note that *Hypotrachyna afrorevoluta*, reported from California, is similar to *H. revoluta* and that most specimens from the Pacific Northwest would fit the concept of *H. afrorevoluta*, if accepted; extremes seem to intergrade and further studies are needed to determine if the separation of these two species is justified in western North America. Nash III et al. (2002) remark that this species exhibits considerable morphological plasticity and requires further evaluation.

FIELD SUMMARY — A greenish-gray foliose lichen with revolute margins, simple to sparsely branched rhizines, terminal soralia and a green photobiont. Epiphytic, sometimes saxicolous and terricolous.

Diagnostic characters — *Hypotrachyna revoluta* can be distinguished by its (1) revolute lobe margins, (2) mostly apical soralia, (3) sparsely branched or unbranched rhizines, (4) grayish upper surface, and (5) negative K reaction.

Description

THALLUS — foliose, medium-sized, 3–8 cm broad; lobes short, 1–4 mm wide, with revolute margins often appearing somewhat tubular; lobe axils rounded, producing the typical circular spaces between the overlapping lobes characteristic of the “loop lichens”; upper surface whitish to greenish-gray to somewhat bluish-gray, sometimes with sorediate pustules that erode, leaving blackened medullary tissue exposed; lower surface black, browning near the edges, rhizinate. —soredia generally granular, arising mostly at lobe tips and breaks in the cortex, spreading over the laminal surface. —isidia absent. —rhizines mostly simple but sometimes dichotomously branched, sparse to abundant, variable in length. —cilia absent. —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — rare, reddish-brown, thalline, 2–6 mm, sessile to substipitate. —asci 8-spored. —spores simple, ellipsoid, hyaline, 6–8 × 10–12 µm.

CHEMISTRY— cortex K+ yellow, KC-; medulla K-, KC+ red, C+ pink to red, P-, UV-.

Ecology — *Hypotrachyna revoluta* is known mainly from hardwood and conifer trees in coastal and riparian forests, but is sometimes found on rock or soil. In Arizona, it is known from acidic rock or bark in forest habitats.

Distribution — *Hypotrachyna revoluta* is known from Eurasia, Africa, North and South America. In western North America, *H. revoluta* is known from British Columbia, Washington, Oregon, California, and Arizona. It has also been reported east to the Rocky Mountains. In Oregon, *H. revoluta* is reported from Clatsop, Coos, Curry, Douglas, Lane, Lincoln and Tillamook counties within the Coast Range, West Cascades and Willamette Valley ecoregions.

Similar species — *Hypotrachyna sinuosa* has a yellowish-green or greenish upper surface. *Hypotrachyna riparia* and *H. revoluta* upper surfaces are whitish-gray to blue-grey. However, *H. riparia* has richly branched, dense rhizines, terminal and subterminal soralia, and P+, K+, C- and KC- medulla reactions. *Hypotrachyna laevigata*, rarely collected in the southwestern United States, can have soralia similar to *H. revoluta*, but lacks revolute lobe margins.

References — Hale (1975, p. 60), Nash III et al. (2002a, p. 238).

References with color photos — McCune and Geiser (2009, p. 160), Brodo (2001, p. 359).



Plate 19. *Hypotrachyna revoluta*. A–D. Thallus. (A–D: Sharnoff Pers. Coll.)

Hypotrachyna riparia McCune

Recent synonyms: none

Common name: riparian loop lichen

FIELD SUMMARY — A gray, foliose lichen with revolute margins, abundant dichotomously branched rhizines and a green photobiont. Epiphytic.

Diagnostic characters — *Hypotrachyna riparia* can be distinguished by its (1) gray coloration, (2) abundant, richly dichotomously branched rhizines, (3) terminal to subterminal soralia, and (4) P+, K+, C- and KC- medulla reactions.

Description

THALLUS — foliose, medium-sized, 3–8 cm broad; lobes semi-appressed, 1.5–5 mm wide, somewhat revolute just below apices, which are often reflexed and/or cucullate; upper surface whitish-gray to mineral gray or bluish-gray; lower surface black with brown margins and densely rhizinate. —soredia powdery, arising on the upper surface in terminal or subterminal soralia. —isidia absent. —rhizines bushy, abundant, dichotomously branched. —cilia absent. —pycnidia not seen. —photobiont green (*Trebouxia*).

APOTHECIA — unknown.

CHEMISTRY— cortex K+ yellow, C-, KC-, P- or P+ pale yellow, UV-; medulla K+ yellow to orange, C-, KC-, P+ orange to red, UV-.

Ecology — *Hypotrachyna riparia* is known from bark of shrubs and hardwood trees in riparian forests and ash swamps where standing water accumulates in winter months.

Distribution — *Hypotrachyna riparia* is endemic to western North America, where it is known only from Oregon and reported from Clackamas, Lane, and Linn counties within the West Cascades and Willamette Valley ecoregions.

Similar species — See *Hypotrachyna revoluta* for a discussion of similar species.

References — McCune (1998).

References with color photos — McCune and Geiser (2009, p. 161).

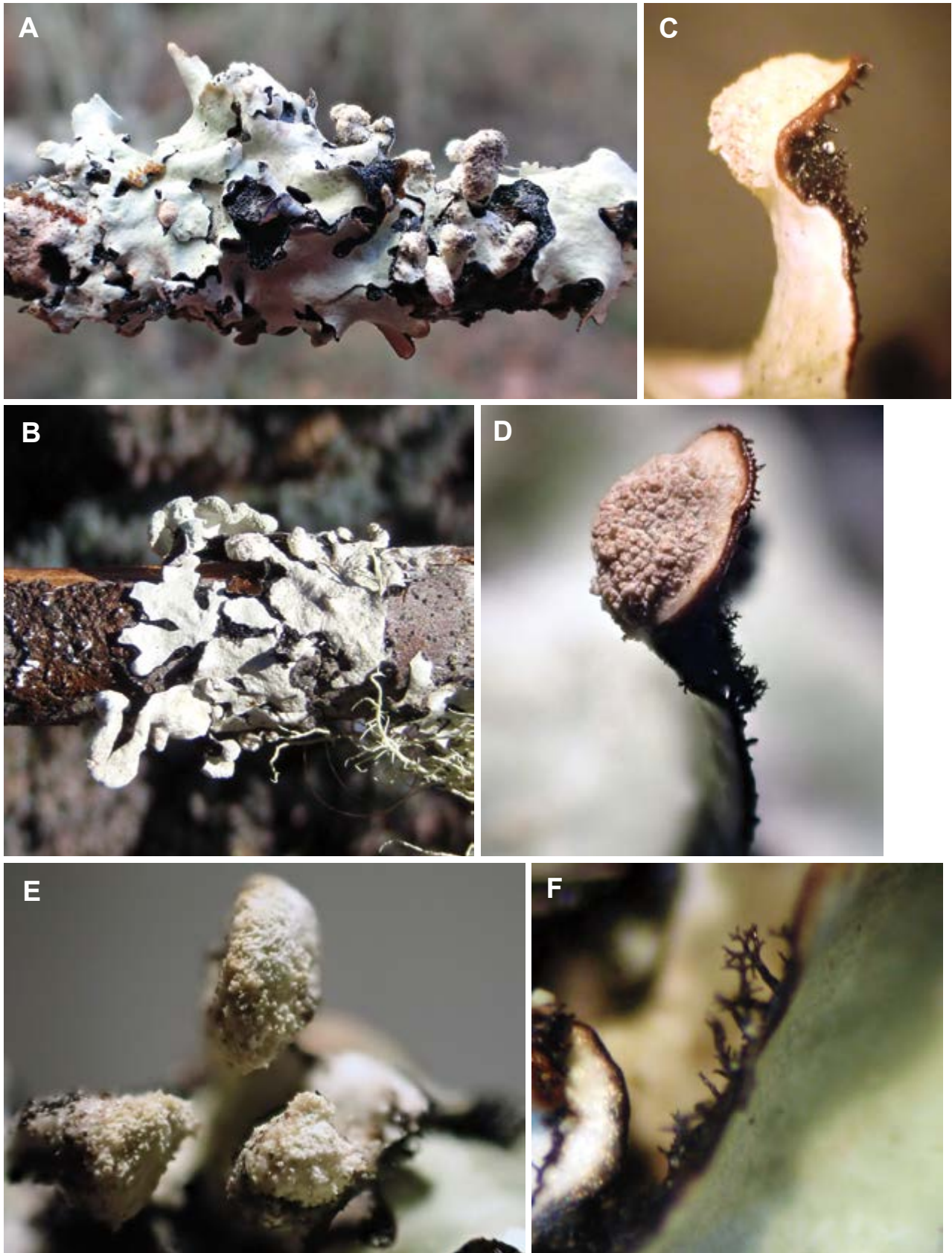


Plate 20. *Hypotrachyna riparia*. A. Thallus. B. Thallus with terminal soralia. C. Cucullate lobe tip. D–E. Terminal soralium. F. Branched rhizines. (A–F: Loring Pers. Coll.)

Leioderma sorediatum D. Galloway and P.M. Jørgensen

Recent synonym: none

Common name: mouse ears

FIELD SUMMARY — A small, blue-gray, soresiate, foliose lichen with a cyanobacterial photobiont. Epiphytic.

Diagnostic characters — *Leioderma sorediatum* can be distinguished by its (1) cyanobacterial photobiont, (2) lobes less than 1 cm, (3) coarse, marginal soresia containing the photobiont, (4) thick matted tomentum on the upper surface, (5) negative medullary P reaction, and (6) coastal habitat.

Description

THALLUS — foliose, 0.5–3 (4) cm broad, appearing gray when dry and blue-green when wet; lobe margins scalloped to crenulate, thickened, soresiate, with flattened to slightly concave lobes 2–4 (6) mm wide; upper surface with matted tomentum, lower surface white. —soresia blue-gray, coarse, in marginal soralia. —isidia absent. —rhizines sparse, tufted. —cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Scytonema*).

APOTHECIA — unknown.

CHEMISTRY — upper cortex K+ orange or K-, KC-, C-, P-; medulla K+ pale orange (slow reaction) or K-, KC-, C-, P-.

Ecology — *Leioderma sorediatum* is epiphytic in semi-open dune woodlands, deflation plains and ericaceous shrub and Hooker's willow thickets along the coast. It is also known from open shore pine and ericaceous shrub forests. In Washington it is reported from a 10 inch diameter red alder in a young riparian stand.

Distribution — *Leioderma sorediatum* is known from Asia, North and South America, Hawaii, and Australia. In western North America, *L. sorediatum* is known from Alaska, British Columbia, Washington, and Oregon. In Oregon, *L. sorediatum* is reported from Coos, Douglas, Lane, and Lincoln counties within the Coast Range ecoregion.

Similar species — *Erioderma sorediatum* grows in the same habitats but has distinct, erect tomentum on the upper surface and has a P + orange medulla. McCune and Geiser note that “at a glance one would overlook this species as a stunted *Peltigera collina*.” However, *P. collina* has brownish veins on the lower surface and scattered scabrous hairs on the upper surface near lobe margins, lacking thickly matted tomentum.

References — Jørgensen (2000).

References with color photos — McCune and Geiser (2009, p. 166), Leshner et al. (2003, p. 89), Brodo et al. (2001, p. 395).

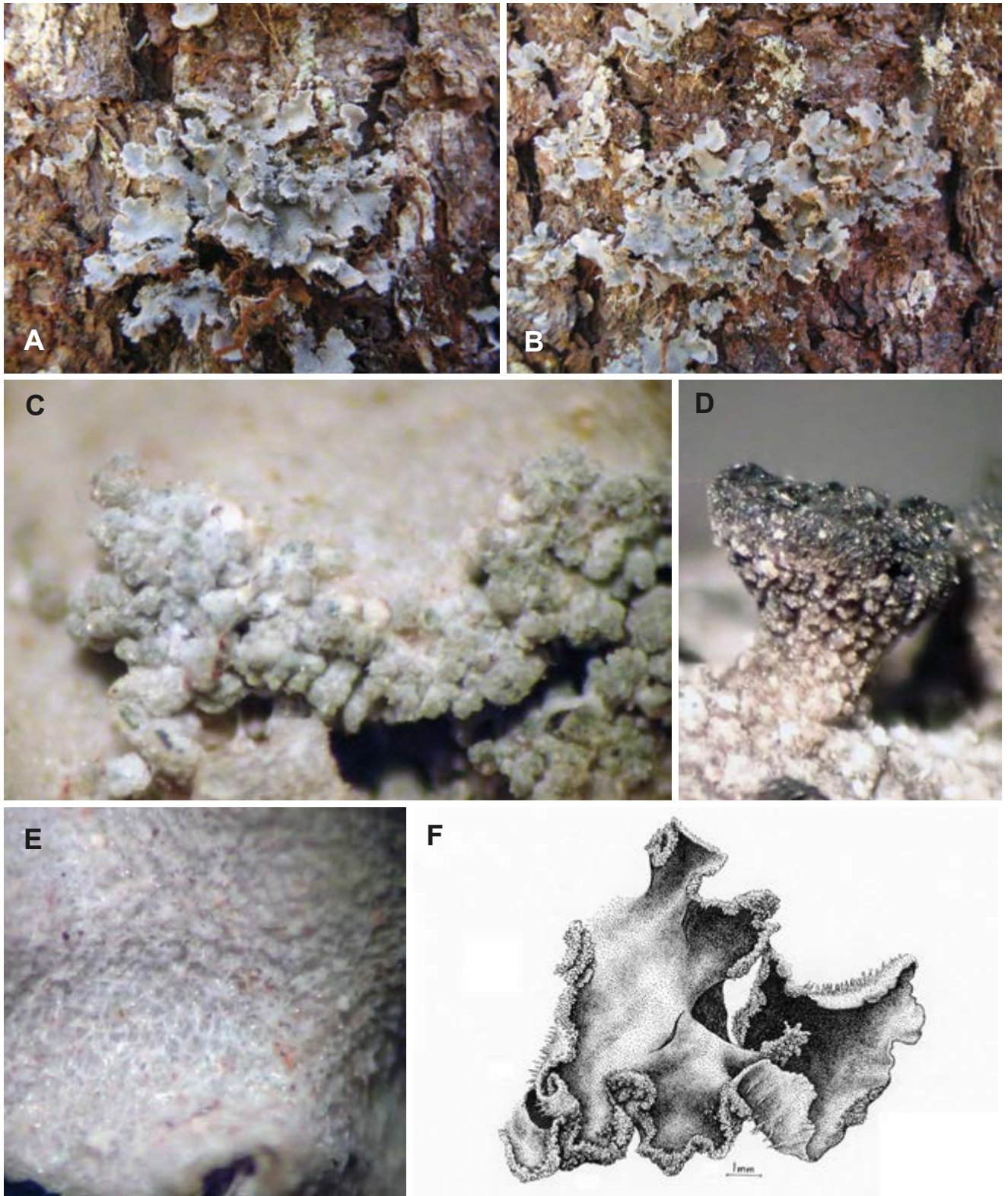


Plate 21. *Leioderma solediatum*. A–B. Thalli. C. Granular soredia. D. Stalked apothecium. E. Matted tomentum on upper surface. F. Mikulin drawing. (A–E: Loring Pers. Coll.)

Leptogium compactum D.F. Stone et al.

Recent synonyms: none

Common name: compact jellyskin lichen

FIELD SUMMARY — A blue-gray, gelatinous, isidiate, smooth or shallowly ridged, non-stratified foliose lichen with a cyanobacterial photobiont. Epiphytic and saxicolous.

Diagnostic characters — *Leptogium compactum* can be distinguished by its (1) relatively smooth or shallowly ridged or textured upper surface lacking numerous sharp wrinkles, 2) development of isidia by elongation of cortex-covered papillae, (3) mostly cylindrical, often branched isidia that become basally constricted as they mature, and (4) densely packed medullary hyphae.

Description

THALLUS — gelatinous, foliose, 3–6 cm broad, loosely attached; lobes rounded, to 20 mm wide, with some of the margins turned down and “resembling rose petals” (Stone et al. 2016), contiguous or sometimes overlapping or separate; upper surface blue-gray, mostly smooth but appearing brown and roughened where isidia appear, sometimes with low, irregular ridging; medulla of dense interwoven hyphae with no intracellular space between the elongate, undulating hyphal strands oriented more or less parallel to the upper and lower surfaces, with shorter perpendicular hyphal cells that are constricted at junctions between cells, with single cells or short chains of *Nostoc* interspersed throughout the hyphae; lower surface gray, tomentose in patches with white to tan hairs mostly 25–50 μm long but sometimes to 1.4 mm long near the margins; upper and lower cortices each with a single layer of isodiametric cells approximately 5–11 μm . — isidia emerge as cortex-covered papillae, irregular in width, somewhat cylindrical, often branched, to 0.5 mm tall, darker brown than thallus surface, becoming constricted at base when mature. — photobiont cyanobacteria (*Nostoc*).

APOTHECIA — uncommon, stipitate; disk reddish-brown, flat, 1–3 mm, margin 0.1–0.2 mm wide, proper exciple a distinct narrow, yellowish-tan line around the inside edge, outer margin concolorous with thallus and covered with isidia; hymenium 110–137 μm tall, hyaline, epihymenium pinkish-brown; paraphyses unbranched, about 2 μm wide. — asci clavate, apex thick-walled, 2–7-spored. — spores hyaline, submuriform, 22.5–27.5 \times 12.5–13 μm , 4- to 5-septate transversely and non- to 1-septate longitudinally.

CHEMISTRY — spot tests negative.

Ecology — In Oregon, *Leptogium compactum* is primarily found in humid habitats associated with riparian corridors or open water. It occurs on bark of both hardwoods (black cottonwood, red alder) and conifers (true fir), but is also known from rock.

Distribution — *Leptogium compactum* is endemic to western North America where it is known from Alaska, British Columbia, Washington, and Oregon. In Oregon, *L. compactum* is reported from Multnomah County within the West Cascades ecoregion.

Similar species — *Leptogium compactum* differs from all other members of the *L. saturninum* group by having tightly packed hyphae in the medulla. *Leptogium cookii* has distinctly darkened lobe margins. *Leptogium hirsutum* has smooth cylindrical, non-constricted isidia. *Leptogium acadiensis*, *L. cookii* and *L. saturninum* differ in having isidia that arise without a continuous cortex. See *Collema curtisporum* for additional information on similar species.

References — Stone et al. (2016).



Plate 22. *Leptogium compactum*. A. Thallus. B. Lower surface with tomentum. C. Isidia
(A–C: Geiser and Derr TNFS# L-1613)

Leptogium cyanescens (Rabenhorst) Körber

Recent synonyms: none

Common name: blue jellyskin lichen

FIELD SUMMARY — A lead gray, isidiate, smooth, gelatinous, non-stratified foliose lichen with a cyanobacterial photobiont. Epiphytic, sometimes saxicolous.

Diagnostic characters — *Leptogium cyanescens* can be distinguished by its (1) smooth, lead gray or blue-gray thallus, (2) smooth, fine, cylindrical isidia, (3) thallus cortex consisting of a single layer of isodiametric cells, with up to 10 rows below the apothecia, (4) interior comprised of compact interwoven elongate hyphae, in a distinct horizontal and vertical crisscross pattern, and (5) lower surface not uniformly tomentose.

Description

THALLUS — gelatinous, foliose, thin, 1–5 cm broad, flat, spreading, lead gray or bluish-gray; lobes rounded, 2–4 (12) mm broad, margins entire to dentate, often isidiate; upper surface smooth to occasionally slightly roughened; cortex of a single layer of irregularly isodiametric cells 5–8 μm , with up to ten additional rows of isodiametric cells below the apothecia; medullary hyphae rather compact, irregularly interwoven in a crisscross pattern parallel and perpendicular to the cortices; *Nostoc* chains often tightly coiled, clustered; lower surface paler, smooth but with scattered tufts of hairs attaching it to substrate. — isidia abundant on the upper surface, cylindrical to clavate to lobulate, often branching, concolorous with the thallus. — photobiont cyanobacteria (*Nostoc*).

APOTHECIA — uncommon, sessile to short stipitate on the upper surface of thallus, 0.5–2.0 mm, light brown to red-brown; thalline exciple entire to isidiate, light gray to cream-colored; disk slightly concave to plane to convex. — asci cylindrical to clavate, 80–105 \times 12–14 μm , uniseriate, 8-spored. — spores hyaline, ellipsoid with apices rounded to pointed, 18–23 \times 6–10 μm , 3-septate transversely, 0–1-septate longitudinally.

CHEMISTRY — spot tests negative.

Ecology — In Oregon, *Leptogium cyanescens* is known from crabapple trunks and branches on edges of coastal wetlands among shrubs and Sitka spruce. Outside of Oregon, it is recorded most commonly on bark of deciduous trees, but also on juniper, cedar, decaying logs, and rocks.

Distribution — *Leptogium cyanescens* is known from Eurasia, North and South America. In western North America, *L. cyanescens* is known from Alaska, British Columbia, Washington, Oregon, California, Idaho, and Colorado. In Oregon, *L. cyanescens* is reported from Curry, Lane and Lincoln counties within the Coast Range and West Cascades ecoregion.

Similar species — There are several similar lead-gray, larger species of *Leptogium* in the Pacific Northwest that are not tomentose below. *Leptogium tacomae* has ellipsoid to submuriform spores 28–36 (40) \times 12–15 μm , with 5–6 transverse septa, a thicker thallus often with brown areas, a medulla of loose tangled hyphae lacking a crisscross pattern, and knobby isidia that are flat to cupped and become coralloid. *Leptogium siskiyouensis* has an interior of isodiametric hyphae, lobe tips that often become brown, larger spores (38 \times 11 μm) that are 6–8 septate transversely and 0–1-septate longitudinally, and isidia that are primarily marginal and become knobby and coralloid. See *Collema curtisporum* for additional information on *Collema* and *Leptogium* species.

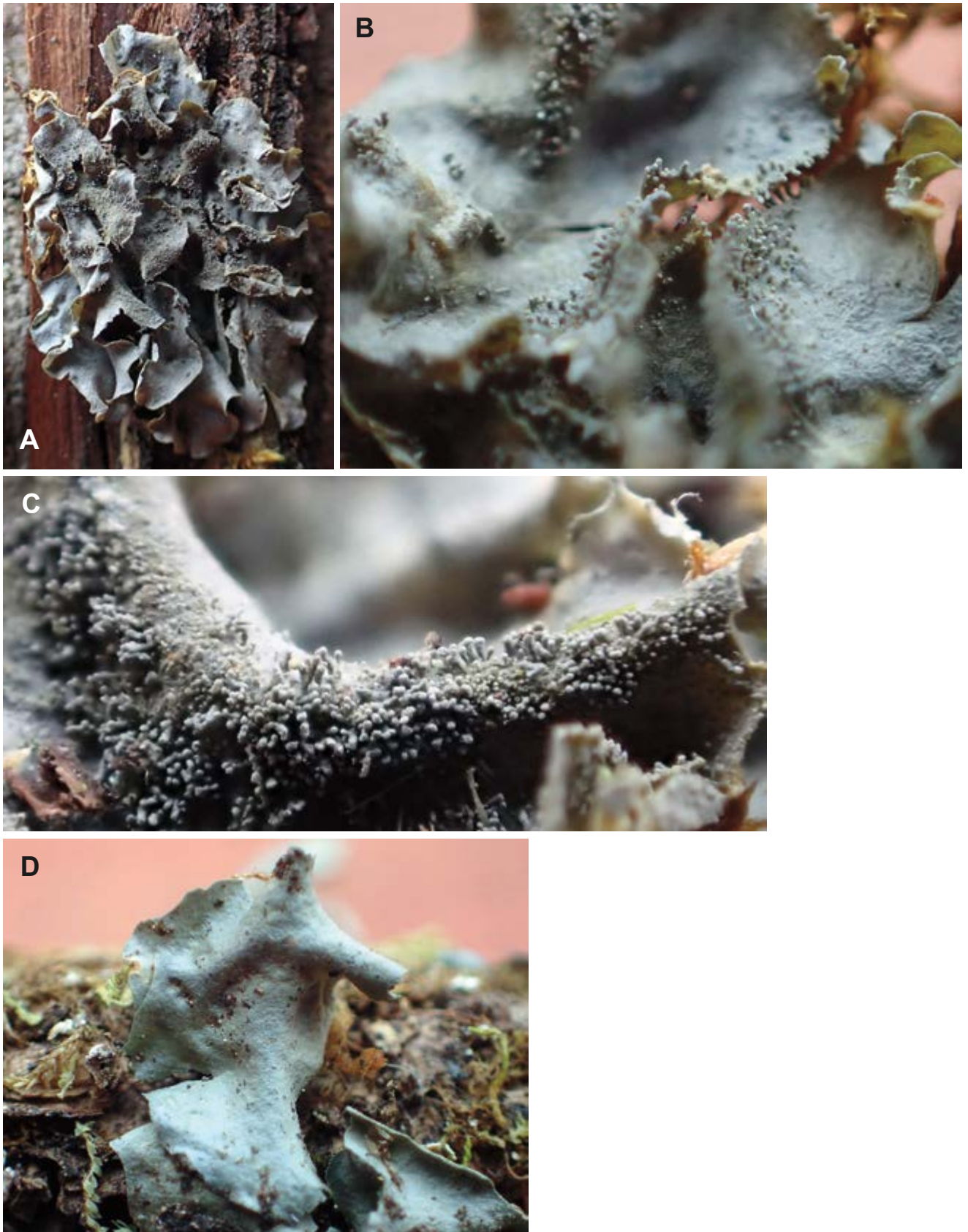


Plate 23. *Leptogium cyanescens*. A. Thallus. B–C. Cylindrical isidia. D. Lower surface lacking tomentum.
(A–D: McCune #23282)

According to Sierk (1964), *Leptogium cyanescens* is the most common species of *Leptogium* in North America, north of Mexico; however, most records are from east of the Rocky Mountains. Moreover, Stone and Ruchty (2012) found that specimens collected in the Pacific Northwest have been widely misidentified. They report that after examining hundreds of herbarium specimens identified as *L. cyanescens* from throughout the Pacific Northwest, only five specimens were found to be *L. cyanescens*. The majority of specimens they examined were found to be *L. tacomae*.

References — Jørgensen and Nash III (2004, p. 338), Sierk (1964).

References with color photos — Stone and Ruchty (2012), McCune and Geiser (2009, p. 177), Brodo et al. (2001, p. 404).

Leptogium platynum (Tuckerman) Herre

Recent synonyms: none

Common names: broad-lobed jellyskin lichen, bat wing vinyl lichen

FIELD SUMMARY — A gelatinous, non-stratified, wrinkled, foliose lichen with laminal lobules and a cyanobacterial photobiont. Saxicolous or terricolous.

Diagnostic characters — *Leptogium platynum* can be distinguished by its (1) lower surface with scattered tufts of hairs or hairless, (2) interior of loosely interwoven hyphae, (3) foliose habit, (4) relatively large, thick thallus, (5) 8-spored asci with large spores, and (6) distinctive, laminal lobules.

Description

THALLUS — gelatinous, foliose, 1–7 cm, lead gray, brown to blackish, flat, spreading, distinctly and narrowly wrinkled; lobes rounded to elongate, 1–6 mm broad, (100) 130–250 (500) μm thick, margins entire to irregularly lacerate to lobulate, ascending but lobe apices turned down; cortex of a single layer of irregularly isodiametric cells 5–9 μm across, sometimes with an extra row of isodiametric cells below the apothecia; medullary hyphae 2–3 μm in diameter, loosely interwoven; *Nostoc* cells spherical to ellipsoid, 2–4 μm in long chains throughout the thallus; lower surface pale gray to brown, wrinkled, with scattered tufts of white hairs or hairless. —isidia absent or present. —lobules few to many, laminal to partly marginal. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — common, often abundant on the upper surface, adnate to sessile, 0.2–0.5 mm; disk concave to plane, brown; thalline exciple entire; subhymenium 25–70 μm thick, yellowish; hymenium 170–220 μm thick, hyaline with a thin yellow epithecium; paraphyses unbranched. —asci cylindrical-clavate, 150–200 \times 12–16 μm , 8-spored, biseriate, distichous to irregular. —spores hyaline, ellipsoid to subfusiform, 35–48 \times 9–16 μm , with pointed apices, muriform, 7–9-septate transversely, 1–2-septate longitudinally.

CHEMISTRY — spot tests negative.

Ecology — *Leptogium platynum* is found on soil and rock below 900 feet in elevation. In Canada it is found exclusively on base-rich rocky outcrops with a regularly occurring moisture regime such as periodic seepage or runoff, and/or the presence of mosses which hold and slowly release moisture. Authors of the COSEWIC report (2011), however, state that the disappearance of this species from historical sites may be attributed in part to competition from mosses on the substrate, as well as atmospheric nitrogen enrichment from agricultural activities. It is absent from habitats exposed to frequent drying and does not tolerate heavy shade or acidic bedrock.



Plate 24. *Leptogium platynum*. A. Upper surface with apothecia. B. Thallus. C. Lower surface. (A–C: McCune #29954)

Distribution — *Leptogium platynum* is known from Asia, North and Central America. In western North America, *L. platynum* is known from British Columbia, Washington, Oregon, California, Arizona, New Mexico, and Mexico. In Oregon *L. platynum* is reported from Coos, Douglas, Josephine, Lane, Lincoln, Linn, and Marion counties within the Coast Range, Klamath Mountains, West Cascades and Willamette Valley ecoregions.

Similar species — *Leptogium gelatinosum* has smaller spores (25–35 × 12–14 µm), a thinner thallus, and lobules that are mostly marginal or absent. *Leptogium polycarpum* has smaller, thinner thalli (less than 2 cm wide), indistinct lobes, no lobules, and four spores per ascus. See *Collema curtisporum* for additional information on similar species.

References — McCune and Geiser (2009), Jørgensen and Nash III (2004, p. 345), Noble (1982), Sierk (1964).

References with color photos — Sharnoff (2014, p. 60), COSEWIC (2011).

Leptogium plicatile (Acharius) Leighton

Recent synonyms: none

Common names: jellyskin lichen, starfish jellyskin lichen

FIELD SUMMARY — A gelatinous, non-stratified, thick, wrinkled to plicate, foliose lichen with granular isidia and a cyanobacterial photobiont. Saxicolous, sometimes terricolous.

Diagnostic characters — *Leptogium plicatile* can be distinguished by its (1) dark brown to black color, (2) granular laminal isidia, (3) calcareous rock habitat, (4) medulla consisting of elongate, loose hyphae, and (5) sub-erect, thick, folded or twisted lobes.

Description

THALLUS — gelatinous, foliose, dark brown to black, 1–5 cm broad, irregularly lobed; lobes variable, elongate or rounded, subterete to flattened, 0.5–2 (3) mm wide, 150–250 µm thick with an ascending, entire margin; upper surface granular-isidiate, irregularly wrinkled to plicate; cortex of a single layer of irregularly isodiametric to somewhat flattened cells 3–5 µm in diameter; medullary hyphae 2–3 µm in diameter, loosely interwoven to compact; *Nostoc* cells spherical, 2–4 µm in diameter, in long chains throughout the thallus; lower surface with scattered tufts of white hairs. —isidia granular. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — common, sessile on the upper surface, brown to dark red-brown, 0.5–1.0 mm; disk concave; hymenium 135–160 µm thick, hyaline with a thin brown epithecium; paraphyses unbranched. —asci clavate, 115–125 × 12–14 µm, spores uniseriate, 8-spored. —spores hyaline, muriform, ellipsoid, apices rounded to pointed, 20–24 × 7–9 µm, 3-septate transversely, 1-septate longitudinally.

CHEMISTRY — spot tests negative.

Ecology — *Leptogium plicatile* is known from seepy or periodically wet calcareous rock or less commonly on acidic rocks, rarely on soil.

Distribution — *Leptogium plicatile* is known from Europe, North America, and New Zealand. In western North America, *L. plicatile* is known from Washington, Oregon, California, Arizona, South Dakota, and Colorado. In Oregon, *L. plicatile* is reported from Coos, Jackson and Josephine counties within the Coast Range and Klamath Mountains ecoregions.

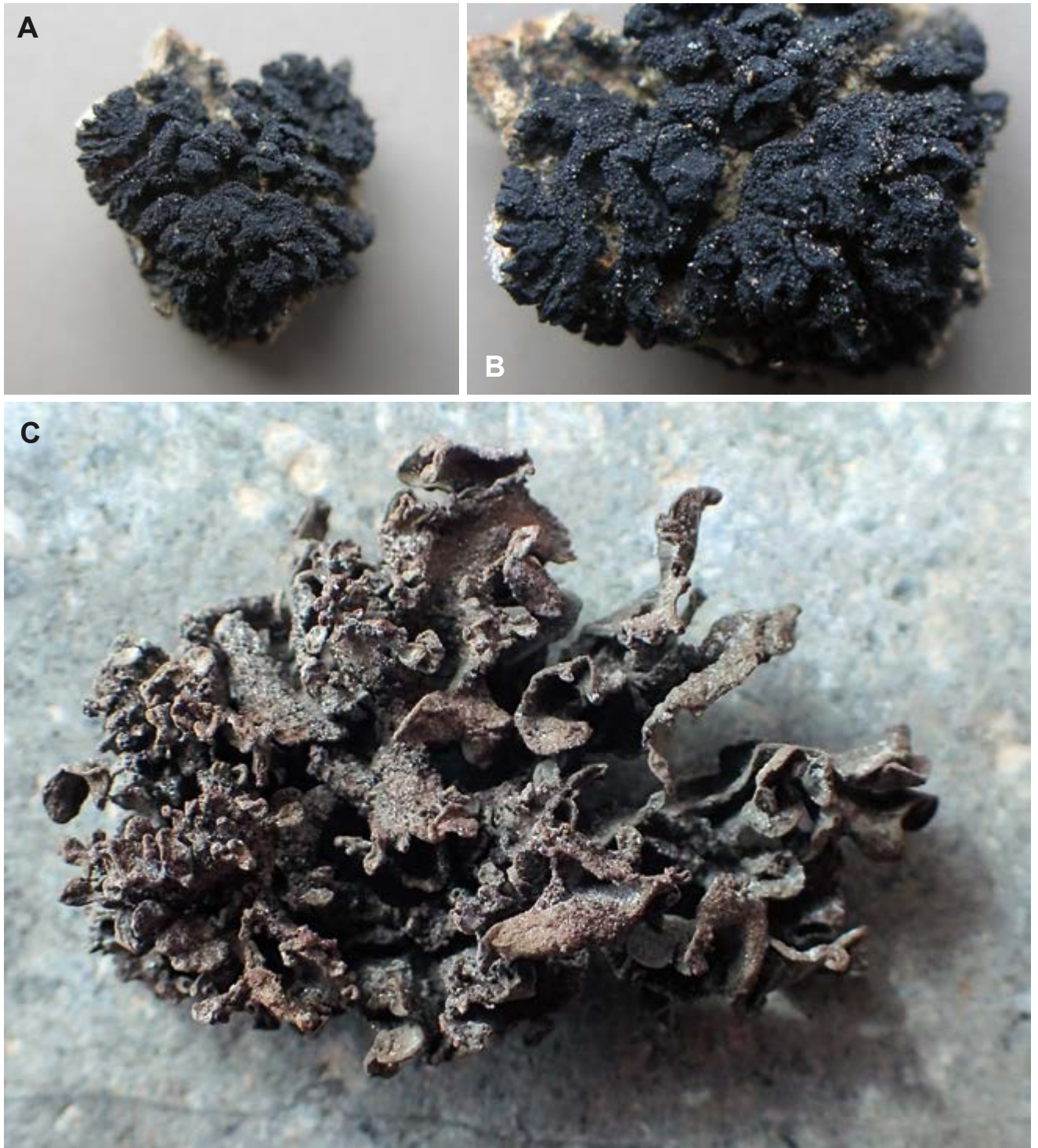


Plate 25. *Leptogium plicatile*. A. Thallus (dry). B. Thallus lobes with granular isidia (dry). C. Thallus (dry).
(A–B: Loring Pers. Coll., C: Follmann #274)

Similar species — *Leptogium turgidum* is known from calcareous soil in the Columbia Basin steppe and has larger, often muriform spores (27–32 × 10–12 µm). *Leptogium tacomae* grows on bark and over moss, has knobby isidia that become coralloid, and has larger spores 28–36 (40) × 12–15 µm, with 5–6 transverse septa. Jørgensen and Nash III (2004) comment, *Leptogium plicatile* is *Collema*-like because the cortices are often poorly developed; it is quite variable and is in need of taxonomic study. See *Collema curtisporum* for additional information on similar species.

References — Jørgensen (2012, p. 38), Jørgensen and Nash III (2004, p. 345), Sierk (1964).

References with color photos — Nordic Lichen Flora (2012, p. 186), Jørgensen and Nash III (2004, color plates).

Leptogium siskiyouensis D.F. Stone and A. Ruchty

Recent synonyms: none

Common names: Siskiyou jellyskin lichen

FIELD SUMMARY — A gelatinous, non-stratified, rosette forming, grayish, isidiate foliose lichen with a cyanobacterial photobiont. Epiphytic.

Diagnostic characters — *Leptogium siskiyouensis* can be distinguished by its (1) closely adnate, rosette-forming habit with upturned lobe margins, (2) sparse, white, clumped hairs on the lower cortex instead of uniform tomentum, (3) gray color, (4) isodiametric interior cells, and (5) marginal and laminal isidia that are simple to coralloid and shiny at least apically.

Description

THALLUS — gelatinous, foliose, gray, with an irregular texture, not wrinkled, thin 44–87 (125) µm; lobes arranged in a regular radial pattern (rosette) forming a circular thallus up to 3 cm broad, lobe tips brown, edges rounded, 0.3–4.0 mm wide, flat to slightly cupped or undulate on the outer margins, center of lobes attached to substrate with margins uplifted to 90 degrees. Adjacent lobes often overlap toward the tips, obscuring the outer sinus between the lobes; upper and lower cortices similar, one cell thick of isodiametric cells 5–8 µm; medulla of closely packed, short, isodiametric hyphae with interhyphal spaces filled with single to clumped *Nostoc* cells; lower surface with tufts of white hairs at least 1 mm from the outer margin. —soredia absent. —isidia gray to brown maturing dark brown, corticate, laminal and marginal; marginal isidia on upturned lobe edges, simple at first, becoming forked to coralloid; laminal isidia often smaller and less branched. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — uncommon, spherical, maturing to flat or hemispherical, substipitate. —spores elongate with tapered ends, muriform, 38 × 11 µm, 6–8-septate transversely, 0–1-septate longitudinally.

CHEMISTRY — spot tests negative.

Ecology — *Leptogium siskiyouensis* is epiphytic on smooth bark and branches of golden chinquapin, California black oak, Douglas-fir, and Oregon ash, in mixed conifer-hardwood forests from 1,200 to 3,800 feet in elevation. Habitats consist of Douglas-fir forests with incense cedar, ponderosa pine, Oregon white oak, California black oak, madrone, and chinquapin.

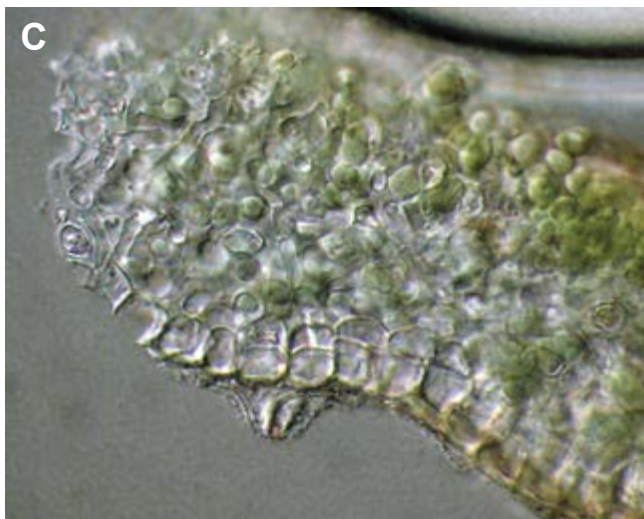
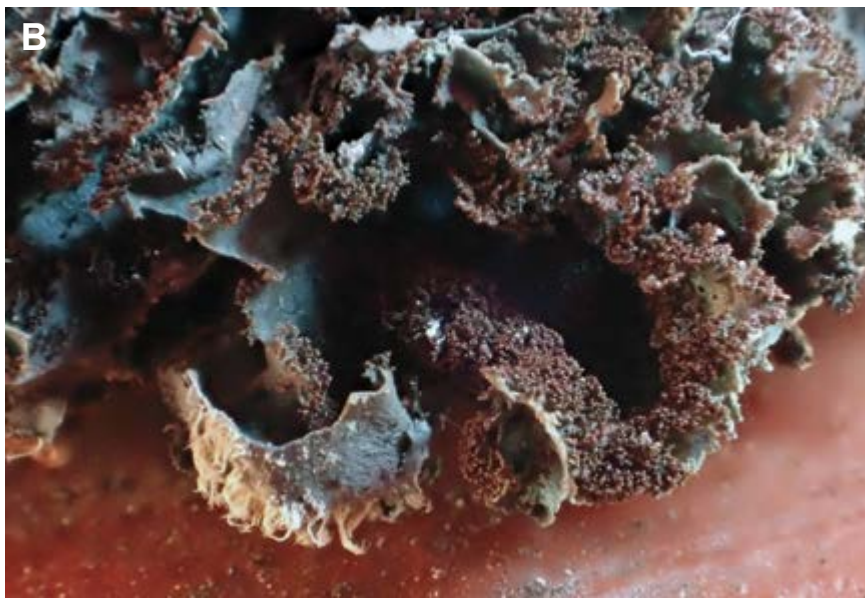
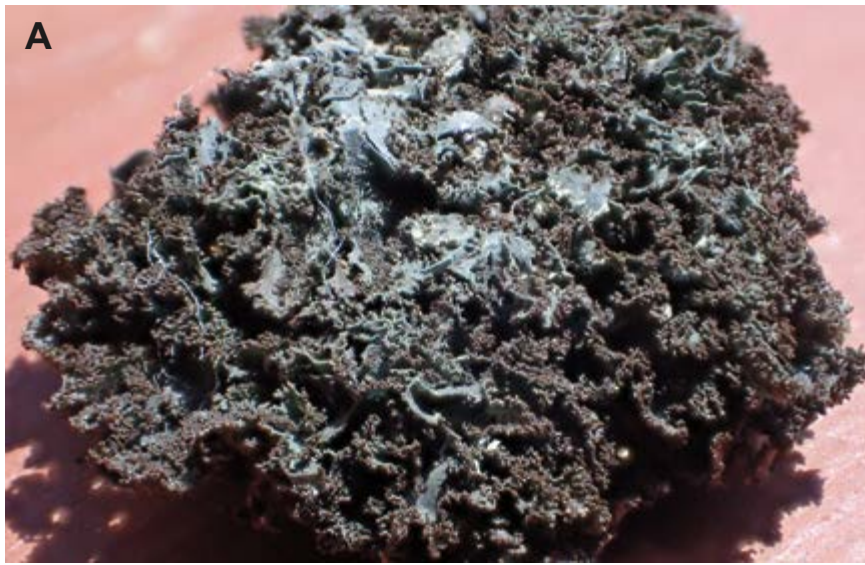


Plate 26. *Leptogium siskiyouensis*. A. Thallus. B. White hairs on lower surface. C. Isodiametric interior cells. D. Isidia. (A–D: McCune #18354)

Distribution — *Leptogium siskiyouensis* is endemic to western North America where it is known from California and Oregon. In Oregon, *L. siskiyouensis* is reported from Jackson and Josephine counties within the Klamath Mountains ecoregion.

Similar species — Several species of gray, isidiate *Leptogium* occur in the Pacific Northwest. Of these, only *L. siskiyouensis* and *L. pseudofurfuraceum* have medullary hyphae of isodiametric cells. *Leptogium pseudofurfuraceum* differs by having a tomentose lower surface, a heavily wrinkled brown thallus, and lobes up to 1 cm wide with margins turned downward. *Leptogium tacomae* thalli are usually less adnate and form cushion-like rosettes. *Leptogium subaridum* is black-brown in color and has simple to branched isidia that are clavate, deeply dimpled, and never coralloid. Additionally, *L. tacomae* and *L. subaridum* have loosely packed, elongate medullary hyphae. See *Collema curtisporum* and *Leptogium cyanescens* for additional information on similar species.

References with color photos — Stone and Ruchty (2008).

Letharia gracilis Kroken

Recent synonym: none

Common name: slender wolf lichen

FIELD SUMMARY — A bright fluorescent yellow-green fruticose lichen with smooth branches and a green photobiont. Epiphytic.

Diagnostic characters — *Letharia gracilis* can be distinguished by its (1) fluorescent yellow-green or chartreuse color, (2) lack of isidia or soredia, (3) sparse branching, and (4) relatively smooth, cylindrical branches.

Description

THALLUS — fruticose, tufted or sub-pendulous, bright fluorescent yellow-green or chartreuse; branches sparse, terete to weakly foveolate, up to 12 cm long, sometimes longer, 0.5–2.5 (3) mm in diameter. —soredia and isidia absent. —rhizines and cilia absent. —pycnidia common, appearing as black spots on the cortex. —photobiont green (*Trebouxia*).

APOTHECIA — common, medium to dark brown, to 1 cm with a fibrillose, thalline margin. —spores ellipsoid, $7.3\text{--}7.8 \times 4.0\text{--}5.0 \mu\text{m}$.

CHEMISTRY — spot tests negative.

Ecology — *Letharia gracilis* is known from bark and wood of trees in montane to subalpine forests. In California it is reported from old mixed-conifer forests (Douglas-fir, cypress, true fir) and in Oregon on Douglas-fir, sugar pine and true fir.

Distribution — *Letharia gracilis* is known from North America. In western North America, *L. gracilis* is known from Oregon and California. In Oregon, *L. gracilis* is reported from Douglas, Jackson, Josephine, and Klamath counties within the Klamath Mountains and West Cascades ecoregions.

Similar species — *Letharia columbiana* is distinguished by its wrinkled and ridged branches with flat portions or depressions between the ridges, while *L. gracilis* has relatively smooth, cylindrical branches. *Letharia vulpina* has wrinkled branches, soredia and/or isidia, and rarely produces apothecia.



Plate 27. *Letharia gracilis*. A Thallus. B. Apothecium. C. Branches. (A-C: Loring, Pers. Coll.)

References — McCune and Altermann (2009).

References with color photos — McCune and Geiser (2009, p. 186).

Lobaria linita (Acharius) Rabenhorst

Recent synonym: *Sticta linita* Acharius

Common name: cabbage lungwort

FIELD SUMMARY — A large ridged and pitted foliose lichen lacking soredia, isidia, and lobules, with a green primary algal photobiont and cephalodia.

Diagnostic characters — *Lobaria linita* can be distinguished by its (1) greenish color, (2) lack of soredia, isidia, and lobules, and (3) negative spot tests.

Description

THALLUS — foliose, 5–15 (30) cm broad; lobes rounded, 1–3 (4) cm wide and up to 6 cm long; upper surface reticulate, grass green when wet (although saxicolous specimens in Oregon appear more brownish in exposed habitats); lower surface pale, with light-colored tomentum darkening with age. —soredia and isidia absent. —rhizines sparse, scattered, dark, to 4 mm. —cilia absent. —pycnidia laminal, marginal, or absent. —photobiont green (*Myrmecia biatorellae*) with internal cephalodia (*Nostoc*).

APOTHECIA — common when epiphytic at lower elevations (*Lobaria linita* var. *tenuior*) but usually absent in terricolous or saxicolous arctic and alpine species (*L. linita* var. *linita*), 1–4 mm, reddish-brown, flat to convex; exciple indistinct. —asci 6–8-spored. —spores 1 (3)-septate, hyaline, ellipsoid to spindle-shaped, 21–34 × 6–9 μm.

CHEMISTRY — spot tests negative.

Ecology — Two varieties of *Lobaria linita* are recognized. *Lobaria linita* var. *tenuior* is epiphytic on conifer trunks in the western Cascade Mountains in older coniferous forests. It is most common in northwestern Washington in Pacific silver fir and western hemlock forests, often within Alaskan huckleberry plant associations. *Lobaria linita* var. *linita* grows on mossy rocks and on alpine sod in arctic and alpine habitats, has a smaller thallus, and more sharply defined ridges.

Distribution — *Lobaria linita* is known from Eurasia and North America. In western North America, *L. linita* is known from Washington, Oregon, California, and Idaho. In Oregon, *L. linita* is reported from Clackamas, Douglas, Jackson, Lane, Linn, Marion, and Yamhill counties within the Coast Range, Klamath Mountains and West Cascades ecoregions.

Similar species — *Lobaria pulmonaria* is most similar in appearance to *L. linita*. However, *L. pulmonaria* is sorediate and exhibits positive K and P medullary reactions. Young specimens of *L. pulmonaria* that have not yet developed soredia are distinguished by the positive spot tests. *Lobaria linita* is our only green *Lobaria* species lacking both soredia and lobules. *Lobaria oregana* is usually yellow-green in color, has lobules, a KC+ yellow cortex, and a K+ yellow and P+ orange medulla. *Lobaria scrobiculata* and *L. hallii* have cyanobacteria (*Nostoc*) as the primary photobiont, are sorediate, and are only weakly or not at all reticulate.



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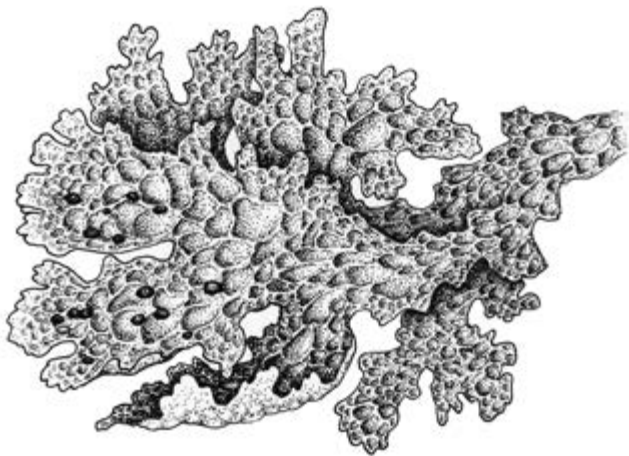


Plate 28. Lobaria linita. A. Lobaria linita var. linita thallus (dry). B. L. linita var. linita thallus (wet). C. L. linita var. tenuis fertile thallus. D. Mikulin drawing. (A–C: Loring Pers. Coll.)

References — [Cordeiro et al. \(2012\)](#), Thomson (1984), Jordan (1973), Jordan (1970).

References with color photos — McCune and Geiser (2009, p. 190), Leshner et al. (2003, p. 117), Brodo et al. (2001, p. 416), Vitt et al. (1988, p. 234).

Melanelia commixta (Nylander) Thell

Recent synonym:

Cetraria commixta (Nylander) Fries

Cetrariella commixta (Nylander) Thell and Karnefelt

Common name: intermingled camouflage lichen

FIELD SUMMARY — A brown, rosette forming, foliose lichen with black rhizines, pale lower surface, marginal pseudocyphellae, marginal pycnidia on finger-like projections and a green photobiont. Saxicolous, rarely muscicolous or epiphytic.

Diagnostic characters — *Melanelia commixta* can be distinguished by its (1) saxicolous habitat, (2) lower surface paler than upper surface, (3) K-, P-, UV+ medullary reaction, (4) cylindrical conidia formed in marginal finger-like projections, and (5) channeled lobes.

Description

THALLUS — foliose, forming rosettes 1–8 (15) cm broad; lobes narrow, to 2 (4) mm wide, shallowly channeled; upper surface bronze-black to blackish-brown with small, whitish, laminal and marginal pseudocyphellae; lower surface pale to brown. —soredia and isidia absent. —rhizines black, scattered. —cilia absent. —pycnidia common, mostly marginal but also laminal, protruding or immersed, borne on finger-like projections from lobe margins with cylindrical conidia 3–4 × 1 µm that are not enlarged at the ends. —photobiont green (*Trebouxia*).

APOTHECIA — marginal or centrally terminal on short lobes, black to blackish-brown, thalline with a thin or irregularly thickened margin, smooth, concave, to 5 (7) mm. —asci broadly clavate, 8-spored. —spores simple, hyaline, ellipsoid, (7) 8–10 (10.5) × 4.5–6.5 µm.

CHEMISTRY — medulla K-, KC+ red or KC-, C-, P-, UV+.

Ecology — *Melanelia commixta* is known from siliceous rock, rarely on bryophytes on siliceous rock or as an epiphyte, in open, dry, mostly arctic-alpine and boreal habitats.

Distribution — *Melanelia commixta* is known from North America and Europe. In western North America, *M. commixta* is known from Washington, Oregon, Idaho, Colorado, and New Mexico. In Oregon, *M. commixta* is reported from Marion County within the West Cascades ecoregion.



Plate 29. *Melanelia commixta*. A. Thallus. B. Apothecia and marginal pycnidia. C. Stalked pycnidia.
(A–C: Loring Pers. Coll.)

Similar species — *Melanelia hepatizon* has a dark lower surface and the medulla is K+ yellow, P+ orange and UV-. Additionally, the pycnoconidia in *M. hepatizon* have a narrow center with swollen ends (dumbbell shaped), while the pycnoconidia in *M. commixta* are cylindrical. Many *Cetraria* and *Melanelia* species have asexual propagules and/or do not have channeled lobes. Multiple species of *Cetraria* appear similar overall and have pycnidia raised on finger-like projections, but differ in substrate and by having more erect lobes. Thell (1995) provides a comparison of species included in the *Melanelia commixta* 'group': *M. agnata*, *M. commixta*, *M. culbersonii*, *M. hepatizon*, and the type, *M. stygia*. All species have dumbbell shaped pycnoconidia with the exception of *M. commixta*.

References — McCune and Geiser (2009, p. 53), Rico et al. (2005), Thell (1995), Thomson (1984, p. 74).

Nephroma occultum Wetmore

Recent synonym: none

Common name: cryptic kidney lichen

FIELD SUMMARY — A reticulately ridged, sorediate, foliose lichen with dark bluish-gray coloration (wet) or greenish-gray coloration with yellow or tan hues (dry) and a cyanobacterial photobiont. Epiphytic.

Diagnostic characters — *Nephroma occultum* can be distinguished by its (1) steel gray or bluish-gray coloration when wet, (2) cyanobacterial photobiont, (3) coarse laminal and marginal soredia, (4) appressed habit, (5) reticulate ridges on the upper surface, and (6) smooth lower surface lacking tomentum.

Description

THALLUS — foliose, 2–6 cm broad, steel gray or bluish-gray when wet, yellow-green when dry; lobes 4–12 mm, wide sometimes becoming brown at the margins; upper surface reticulately ridged; lower surface smooth, cream-colored, sometimes darker centrally. —soredia coarse, granular, present marginally and along laminal ridges, sometimes subsidiate. —isidia absent. —rhizines and cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — Unknown.

CHEMISTRY — spot tests negative or cortex K+ yellow.

Ecology — *Nephroma occultum* is endemic to the Pacific Northwest and often occurs where *Lobaria oregana* and other cyanolichens are abundant. Most sites have been recorded from mid- to upper canopy and windblown branches within older (300 years) Douglas-fir, western hemlock and Pacific silver fir forests from 1,000 to 3,200 feet in elevation. It occurs in cool, humid microclimate conditions associated with old-growth and has been recorded on western red cedar, subalpine fir, bigleaf maple, and rhododendron. *Nephroma occultum* is occasionally found in coniferous second growth and mid-seral stands and is reported from one location on the beam of a log bridge.

Distribution — *Nephroma occultum* is known from North America. In western North America, *N. occultum* is known from Alaska, British Columbia, Washington, and Oregon. In Oregon, *N. occultum* is reported from Clackamas, Douglas, Jackson, Lane, Linn, and Marion counties within the West Cascades ecoregion.

Similar species — *Nephroma occultum* resembles *Lobaria oregana* and is likely overlooked when dry because of its similar coloration and superficial similarity. However, *L. oregana* is lobulate and lacks soredia. *Lobaria pulmonaria* is also similar in color when dry and is sorediate, but differs in lobe shape. The blue-gray color of *Nephroma occultum* when wet distinguishes it from *L. oregana* and *L. pulmonaria*, both of which have a green primary photobiont. *Lobaria scrobiculata* and *L. hallii* have similar dark bluish-gray coloration when wet, but have finer soredia and tomentose lower surfaces. Furthermore, the upper surface of *L. hallii* is scabrous towards the lobe tips.

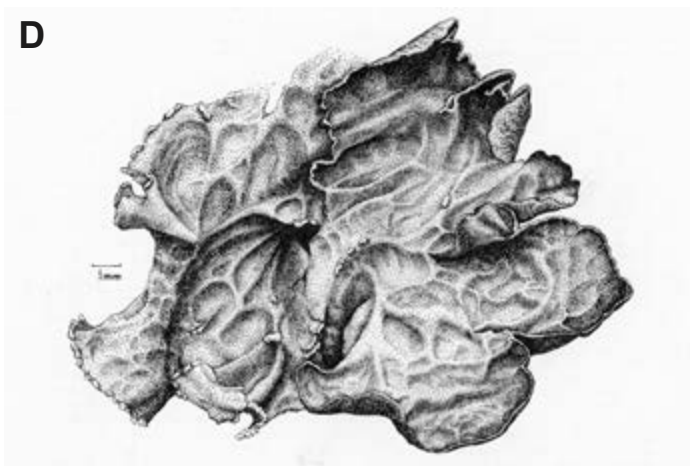


Plate 30. *Nephroma occultum*. A. Thallus (dry). B. Thallus (wet). C. Lower surface. D. Mikulin drawing. (A–C: Loring Pers. Coll.)

Nephroma occultum is generally more appressed to the substrate than any of the local *Lobaria* species. *Nephroma parile* also has soredia, but has a brown upper surface (wet or dry) that lacks the reticulate ridges of *N. occultum*.

References — Rosso et al. (2000), Goward (1995).

References with color photos — McCune and Geiser (2009, p. 211), Brodo et al. (2001, p. 455).

Niebla cephalota (Tuckerman) Rundel and Bowler

Recent synonyms:

Desmazieria cephalota (Tuckerman) Follman and Huneck

Ramalina cephalota Tuckerman

Common name: powdery fog lichen

FIELD SUMMARY — A fruticose, sorediate, pale yellowish-green lichen with blue soredia, black pycnidia and a green photobiont. Epiphytic and saxicolous.

Diagnostic characters — *Niebla cephalota* can be distinguished by its (1) soft, non-cartilaginous branches that are irregular in cross-section, (2) bluish soredia, (3) branches with black spots and bands, (4) production of filamentous crystals in herbarium specimens, and (5) hypermaritime habitat.

Description

THALLUS — fruticose, yellow-green to pale green or pale yellow, tufted to drooping; branches 2–4 cm long and less than 2 mm in diameter, pitted and ridged, irregularly round in cross section with random black spots. Herbarium specimens in time produce cobwebby, filamentous crystals resembling mold. —soredia bluish-gray in convex soralia. —isidia absent. —rhizines and cilia absent. —pycnidia black, usually abundant. —photobiont green (*Trebouxia*).

APOTHECIA — unknown.

CHEMISTRY — cortex K+ yellow; other spot tests variable; medulla is usually negative for all spot tests but rare populations have a K+ red medulla.

Ecology — *Niebla cephalota* is known from Hooker's willow, Sitka spruce, shore pine, and Monterey cypress in open forests, forest edges, and scrublands along windswept headlands, sand dunes, deflation plains, and marshy swales along the immediate coast.

Distribution — *Niebla cephalota* is known from North and South America. In western North America, *N. cephalota* is known from Alaska, Washington, Oregon, California, and Mexico. In Oregon, *N. cephalota* is reported from Coos, Curry, Lane, Lincoln, and Tillamook counties within the Coast Range ecoregion.

Similar species — *Niebla cephalota* is the only sorediate species of the genus. *Ramalina* species have cartilaginous branches, lack blue soralia, do not typically exhibit black spotting unless diseased, and lack the filamentous crystals produced in herbarium specimens.

References — Bowler and Marsh (2004, p. 372).

References with color photos — Sharnoff (2014, p. 180), McCune and Geiser (2009, p. 214), Leshner et al. (2003, p.133), Brodo et al. (2001, p. 457).

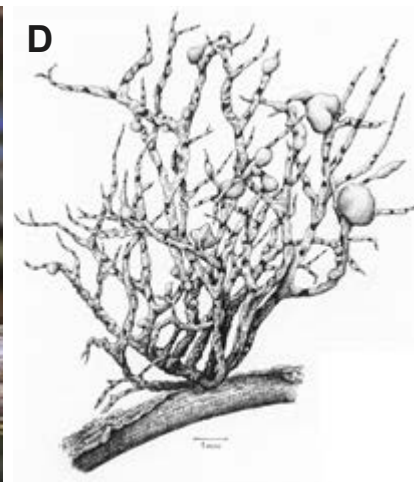


Plate 31. *Niebla cephalota*. A–C. Thallus. D. Mikulin drawing. (A–C: Loring Pers. Coll.)

Pannaria rubiginella P.M. Jørgensen and Sipman

Recent synonym: *Pannaria malmei* C. W. Dodge (misapplied in N. America)

Common name: petalled mouse

FIELD SUMMARY — A subcrustose lichen with minute, crustose-like blue-gray lobes and a cyanobacterial photobiont. Epiphytic.

Diagnostic characters — *Pannaria rubiginella* can be distinguished by its (1) subcrustose, flat lobes, (2) lack of soredia and isidia, (3) distinct black prothallus, (4) negative or weak P+ cortex reaction, and (5) P- medulla reaction.

Description

THALLUS — foliose, forming rosettes 3 to 4 cm broad, blue-gray, pruinose or not, with a distinct black prothallus colonizing substrate ahead of flat, nearly crustose lobes; lobes 2 mm wide. —soredia and isidia absent. —lobules absent. —rhizines black rhizohyphae. —cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — disk reddish-brown, to 2 mm, thalline with a distinct rim. —spores simple, hyaline, ellipsoid, rugose, perispore present, (10) 12–15 (18) × (7.5) 8–9 μm.

CHEMISTRY — cortex P- or weakly P+ orange, K-, KC-, C-; medulla P-; hymenium I+ blue around asci.

Ecology — *Pannaria rubiginella* is known from bark and wood of moist habitats along the coast. In Oregon, it is found as far inland as the West Cascade foothills (although the more inland sites may represent an undescribed species).

Distribution — *Pannaria rubiginella* is known from North and South America. In western North America, *P. rubiginella* is known from Alaska, British Columbia, Oregon, and California. In Oregon, *P. rubiginella* is reported from Coos, Lane, and Marion counties within the Coast Range and West Cascades ecoregions.

Similar species — *Pannaria rubiginosa* grows in the same habitats, but has a P+ orange reaction in both the cortex and medulla. Additionally, *P. rubiginosa* has a larger foliose thallus (to 5 cm broad) with marginally ascending lobes and generally larger spores, 15–19 (21) × 9–10 μm. *Fuscopannaria* and *Pannaria* are similar. *Fuscopannaria* species are small foliose, mostly squamulose to crustose species with a P negative cortex and medulla.

References — McCune and Geiser (2009, p. 218), McCune (2005), Jørgensen (2005), Jørgensen (2004).



Plate 32. *Pannaria rubiginella*. A–C. Thallus with apothecia and prothallus. (A–C: Loring Pers. Coll.)

Pannaria rubiginosa (Thunberg) Delise

Recent synonym: none

Common name: brown-eyed shingle lichen

FIELD SUMMARY — A small, subfoliose lichen with minute, almost crustose-like, blue-gray lobes and a cyanobacterial photobiont. Epiphytic, rarely saxicolous.

Diagnostic characters — *Pannaria rubiginosa* can be distinguished by its (1) small foliose, crust-like lobes, (2) lack of soredia and isidia, and (3) P+ orange cortex and medulla reactions.

Description

THALLUS — foliose, forming rosettes mostly 3–4 cm broad; lobes well-developed, 1–4 mm wide, radiating and somewhat marginally ascending; upper surface bluish-gray or light gray to fawn brown, irregularly pruinose or scabrous; lower surface pale but with black tomentum. —soredia and isidia absent. —rhizines as black rhizohyphae. —cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — thalline, often with beading around the rim, common, bright reddish-brown, 0.5–1.5 mm. — spores simple, hyaline, 15–19 (21) × 9–10 μm.

CHEMISTRY — cortex P+ orange, K-, KC-, C-; medulla P+ orange; hymenium I+ blue around asci.

Ecology — *Pannaria rubiginosa* is epiphytic on Hooker's willow in Douglas-fir, western hemlock, Sitka spruce, western red cedar forests, and thickets of willow and ericaceous shrubs in dune and deflation plain habitats along the coast. It occurs from 50 to 1,600 feet in elevation.

Distribution — *Pannaria rubiginosa* is known from Eurasia, Africa, North and South America. In western North America, *P. rubiginosa* is known from British Columbia, Oregon, California, and New Mexico. In Oregon, *P. rubiginosa* is reported from Coos, Lane, and Lincoln counties within the Coast Range ecoregion.

Similar species — See *Pannaria rubiginella* for a discussion on similar species.

References — Jørgensen (2012a, p. 106), Jørgensen (2004), Leshner et al. (2003, p.141), Jørgensen (2002, p. 306), Jørgensen (2000).

References with color photos — Sharnoff (2014, p. 78), Nordic Lichen Flora (2012, p. 191), McCune and Geiser (2009, p. 219), Brodo et al. (2001, p. 478).

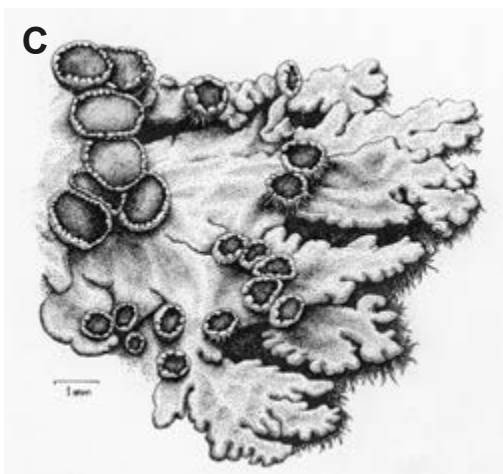


Plate 33. *Pannaria rubiginosa*. A–B. Thallus with apothecia. C. Mikulin drawing. (A–B: Loring Pers. Coll.)

Peltigera cinnamomea Goward

Recent synonym: none

Common name: cinnamon pelt lichen

FIELD SUMMARY — A bluish-gray to brownish-gray foliose lichen, with cinnamon colored rhizines and anastomosing veins on the lower surface and a cyanobacterial photobiont. Muscicolous.

Diagnostic characters — *Peltigera cinnamomea* can be distinguished by its (1) smooth, cinnamon-brown colored rhizines and veins, (2) appressed laminal tomentum on the upper surface, (3) lack of isidia, lobules and soredia, and (4) *Nostoc* as the primary photobiont.

Description

THALLUS — foliose, loosely appressed, 10–30 cm wide; lobes rounded, plane to down-turned, leathery, stiff, elongate, loosely overlapping, 1.5–3 cm. wide; upper surface pale bluish-gray to pale brownish-gray, dull, with appressed tomentum; lower surface with pale tan to rusty-brown (cinnamon-colored) veins; veins distinct, narrow, in part raised, glabrous; interstices whitish, lenticular. —soredia and isidia absent. —rhizines abundant, simple to tufted, concolorous with veins. —cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — common, marginal, on elongated narrow lobes; disk erect, brown, longitudinally folded, 6–10 mm long. —asci 8-spored. —spores hyaline, 40–45 × 3–5 µm, 3-septate.

CHEMISTRY — spot tests negative.

Ecology — *Peltigera cinnamomea* is widely distributed in British Columbia where it is known from moss covered rocks and logs in open to sheltered, inland, mesic to hygrophytic forest at all elevations. Goward et al. (1995) suggest *P. cinnamomea* is one of the most tolerant *Peltigera* to prolonged snow cover (May – June). The type collection is from moss covered boulders at 2,025 feet in elevation in an open mixed forest.

Distribution — *Peltigera cinnamomea* is endemic to western North America where it is known from British Columbia, Alberta, Washington, Oregon, and Montana. In Oregon, *P. cinnamomea* is reported from Clackamas, Jackson, Josephine, and Wallowa counties within the Klamath Mountains, West Cascades, and Blue Mountains ecoregions.

Similar species — In describing *Peltigera cinnamomea*, Goward et al. (1995) discovered many herbarium specimens of *P. cinnamomea* filed under *P. praetextata*. *Peltigera praetextata* has brownish to tan colored, raised veins lacking tomentum but it has discrete rhizines and lobe margins that become “crisped” and lobulate. *Peltigera evansiana* and *P. membranacea* also have appressed-tomentose upper surfaces. *Peltigera membranacea* has very thin lobes and erect-tomentose rhizines and veins that lack the cinnamon brown coloration. *Peltigera evansiana* has isidia.

References — Goward et al. (1995).

References with color photos — McCune and Geiser (2009, p. 240), Goffinet and Hastings (1994, figs 24–25).



Plate 34. *Peltigera cinnamomea*. A. Thallus. B. Upper surface with appressed tomentum. C. Lower surface with cinnamon-colored veins. D. Lower surface with cinnamon-colored veins and concolorous rhizines. (A: McCune #29593, B–C: McCune #21848, D: McCune #29115)

Peltigera hymenina (Acharius) Delise

Recent synonyms: none

Common name: nebulous pelt lichen

FIELD SUMMARY — A gray to brownish, foliose lichen, with anastomosing veins on the lower surface and a cyanobacterial photobiont. Terricolous, muscicolous, saxicolous, sometimes epiphytic on tree bases.

Diagnostic characters — *Peltigera hymenina* can be distinguished by its (1) gray to brownish, maculate, glabrous upper surface, (2) pale, often yellowish-brown lower surface with broad, rather diffuse, indistinct veins, (3) thin, short, pale, mostly simple, sometimes branched rhizines, (4) lack of isidia, soredia and lobules.

Description

THALLUS — foliose, to 20 cm broad, gray to brownish when dry, somewhat maculate; lobes 1–2 cm wide, linear to imbricate; upper surface smooth, matte to glossy, margins ascending; lower surface with diffuse ochraceous or brownish venation. —soredia and isidia absent. —rhizines pale, simple, or fasciculate, to 5 mm long. —cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — saddle-shaped, brown, to 6 mm in diameter. —spores fusiform, $57\text{--}71 \times 3\text{--}5 \mu\text{m}$.

CHEMISTRY — spot tests negative.

Ecology — *Peltigera hymenina* favors damp conditions on soil or on bryophytes in grasslands, dunes, lawns, rock faces, and bases of trees, in coastal and hypermaritime environments.

Distribution — *Peltigera hymenina* is known from Europe, Africa, and North America. In western North America, *P. hymenina* is known from British Columbia, Washington, and Oregon. In Oregon, *P. hymenina* is reported from Coos and Lane counties within the Coast Range ecoregion.

Similar species — Both *Peltigera horizontalis* and *P. elisabethae* are distinguished by horizontal apothecia and rows of rhizines concentrically arranged from thallus center. Additionally, *P. elisabethae* and *P. neckeri* have pruina on the upper cortex near the lobe tips and numerous stress cracks, and *P. neckeri* has blackish apothecia. *Peltigera neopolydactyla* has long rhizines (7–10 mm) and a large thallus with 2–3 cm broad lobes. Additional glabrous *Peltigera* species that lack vegetative propagules include: *P. degenii* and *P. polydactylon*. *Peltigera degenii* has narrow and raised veins that only gradually darken toward the thallus center. *Peltigera polydactylon* has an inland distribution, broad veins, and longer rhizines (2–4 mm) that are often bunched together.

References — Vitikainen (2012, p. 123), Goward et al. (1995).

References with color photos — Nordic Lichen Flora (2012, p. 194), McCune and Geiser (2009, p. 241).



Plate 35. *Peltigera hymenina*. A. Thallus. B. Lower surface with broad, indistinct veins. (A–B: McCune #25321)

Peltula euploca (Acharius) Poelt

Recent synonym: *Heppia euploca* (Acharius) Vainio

Common name: powdery rock-olive

FIELD SUMMARY — An olive-green to brown umbilicate, foliose-squamulose lichen with bluish to black marginal soralia and a cyanobacterial photobiont. Saxicolous.

Diagnostic characters — *Peltula euploca* can be distinguished by its (1) umbilicate habit, (2) cyanobacterial photobiont, and (3) bluish to black marginal soralia.

Description

THALLUS — foliose to squamulose, umbilicate, 3–10 (15) mm broad and 210–370 μm thick, margins thickened, downrolled to plane; upper cortex lacking except for a thin necrotic layer; upper surface olive-green to olive-brown to gray-brown; medulla of loose hyphae; algal layer distinct, 75–150 μm ; lower surface paler than the upper surface, pinkish, composed of anticlinally arranged hyphae. —soredia marginal, farinose, bluish when young, blackening in age. —isidia absent. —rhizines and cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Chroococcidiopsis* or *Myxosarcina*).

APOTHECIA — immersed, lecideine, to 0.7 (1) mm, reddish-brown. —spores simple, ellipsoid to bacilliform, (5) 6–9 (10) \times 3–5 μm .

CHEMISTRY — spot tests negative.

Ecology — *Peltula euploca* is known from noncalcareous rock faces in dry and exposed habitats, as well as shaded habitats in seeps or areas subjected to intermittent water. In Oregon, it is documented from andesite and metamorphic rock in dry sites, and adjacent to vernal pools. The vernal pool specimens tend to have much smaller thalli, appearing almost squamulose. Jørgensen (2012b) includes habitat as calciferous schists on moist, sloping rocks (seepage, lakesides) in the lowlands.

Distribution — *Peltula euploca* is known from Eurasia, North America, and Australia. In western North America, *P. euploca* is known from Oregon and California. In Oregon, *P. euploca* is reported from Jackson, Jefferson, Klamath, and Lake counties within the Blue Mountains, East and West Cascades, Klamath Mountains, and Northern Basin and Range ecoregions.

Similar species — *Peltula euploca* is our only umbilicate cyanolichen in the Pacific Northwest. *Heppia lutosa* is a closely related cyanolichen with rhizohyphae attaching it to its substrate, which is usually calcareous rock. *Peltula bolanderi*, not known from Oregon, is sorediate, smaller (1–2 mm), and has strongly undulate margins.

References — Jørgensen (2012b, p. 132), Büdel and Nash III (2002, p. 333), Hale and Cole (1988, p. 215), Wetmore (1970).

References with color photos — Nordic Lichen Flora (2012, p. 200), McCune and Geiser (2009, p. 259), Nash III et al. (2007 color plates), Brodo et al. (2001, p. 523).

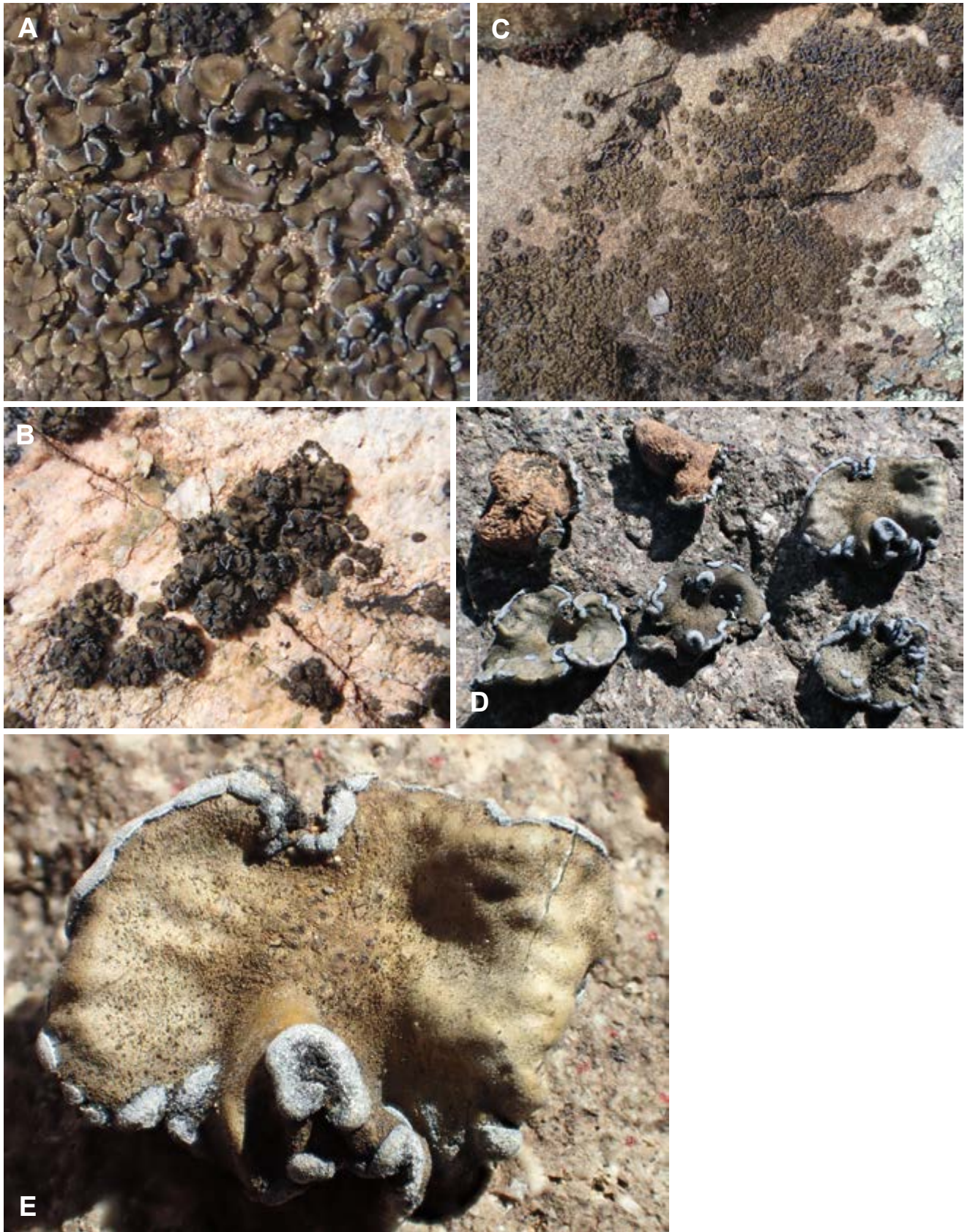


Plate 36. *Peltula euploca*. A–B. Thalli with marginal soredia. C. Colony of thalli. D. Upper and lower surfaces of thalli. E. Thallus with soredia. (A–E: Loring Pers. Coll.)

Pilophorus nigricaulis M. Satô

Recent synonym: none

Common name: black-stemmed matchstick lichen

FIELD SUMMARY — A white, granular, crustose and fruticose lichen with a green primary photobiont and external cephalodia. Saxicolous.

Diagnostic characters — *Pilophorus nigricaulis* can be distinguished by its (1) white, peltate, areolate to crustose primary thallus, and (2) pseudopodetia that are usually less than 4 mm tall and covered in subglobose granules.

Description

THALLUS — of two types. Primary thallus granular or areolate crustose. Secondary thallus of fruticose pseudopodetia; pseudopodetia small, generally 1–4 (6) mm tall and 1 mm in diameter, erect, mostly unbranched, with a black core, irregularly covered with whitish, warty, peltate areoles that also compose the primary thallus; internal structure of pseudopodetia consists of black, compact, gelatinized hyphae; external cephalodia present on the primary thallus, brown, rugulose, irregularly shaped, to 0.5 mm. —soredia and isidia absent. —rhizines and cilia absent. —pycnidia apical on pseudopodetia or sessile on primary thallus. —photobiont green (*Pleurococcus*) with external cephalodia (*Stigonema*).

APOTHECIA — black, subglobose, apical on pseudopodetia or occasionally sessile on the primary thallus, 1.0–2.5 mm. —asci 8-spored. —spores simple, hyaline, ellipsoid when young, maturing spindle-shaped, $18 \times 7 \mu\text{m}$.

CHEMISTRY — cortex K+ yellow; medulla K- or K+ yellow, KC-, C-, P- or P+ orange.

Ecology — *Pilophorus nigricaulis* is known primarily from forested or non-forested communities on noncalcareous rock including talus, boulders, and outcrops. It often occurs on north-facing slopes in cool, moist, open habitats with coastal influence from 130 to 4,700 feet in elevation. One Coastal Mountain site (Lost Prairie), occurs on scattered basalt rocks over bedrock, between a forested community and a sedge/sphagnum wetland.

Distribution — *Pilophorus nigricaulis* is known from Asia and North America. In western North America, *P. nigricaulis* is known from Washington and Oregon. In Oregon, *P. nigricaulis* is reported from Clatsop, Lane, Lincoln, Linn, Marion, and Multnomah counties within the Coast Range and West Cascades ecoregions.

Similar species — Jahns (1981) lists several species that also have a dark central pseudopodetium and states the color of the axis seems to vary with environmental factors; that colorless and hyaline specimens can always be found and that this feature has no taxonomic value. *Pilophorus nigricaulis* specimens found in the West Cascades with taller, highly branched pseudopodetia may represent a different, undescribed species. *Pilophorus aciculare* and *P. clavatus* have gray, green or brown thalli with generally taller pseudopodetia that are covered in fine granules. Additionally, *P. aciculare* has globose, terminal apothecia, while *P. clavatus* has cylindrical or club-shaped apothecia.

References — Leshner et al. (2003, p.147), Goward (1999, p. 199), Onofri et al. (1981), Jahns (1981).

References with color photos — McCune and Geiser (2009, p. 281).

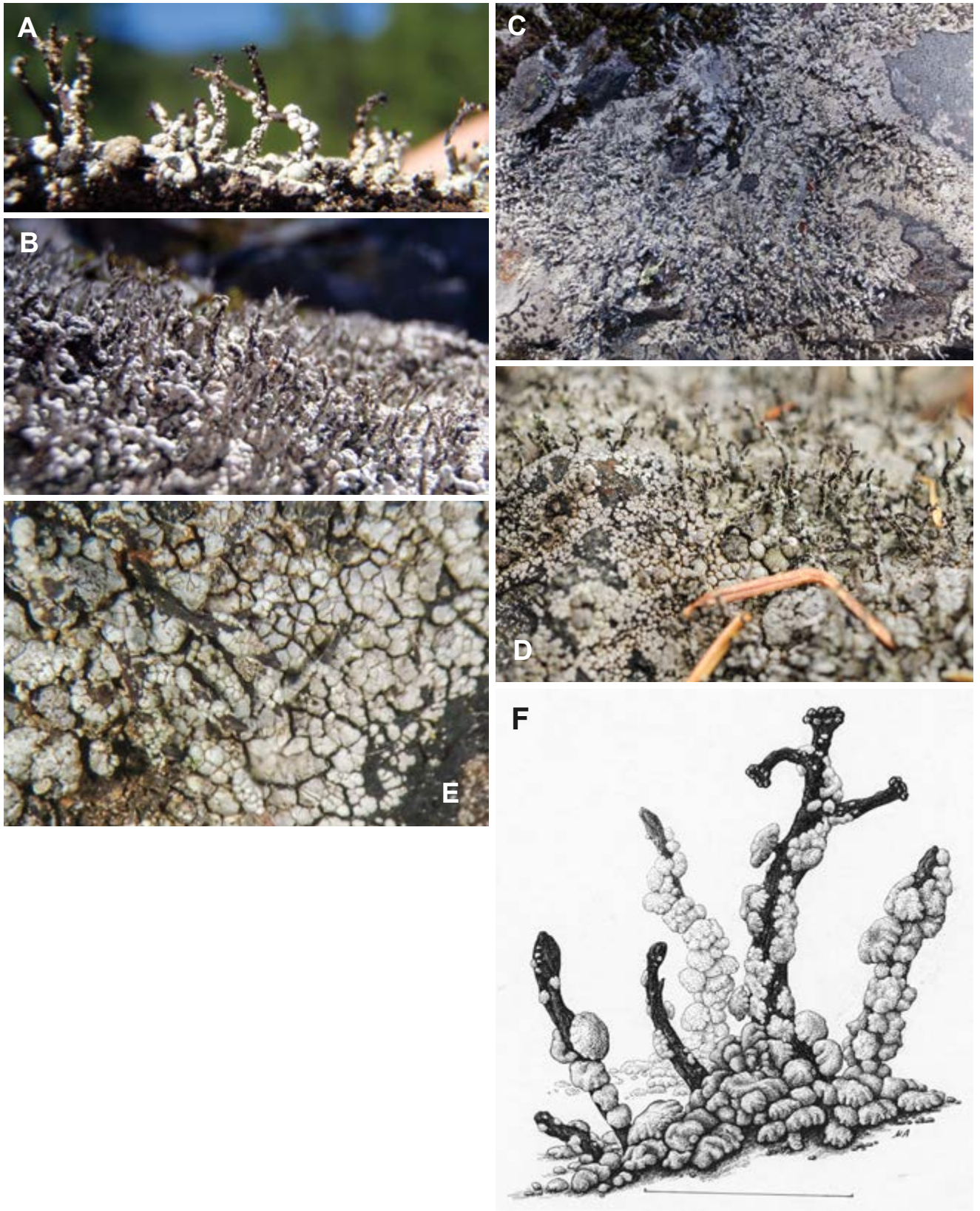


Plate 37. *Pilophorus nigricaulis*. A–B. Pseudopodetia. C–D. Crustose thallus with pseudopodetia. E. Thallus with black prothallus. F. Mikulin drawing. (A–C: Loring Pers. Coll., D–E: Exeter Pers. Coll.)

Pseudocyphellaria hawaiiensis Moncada et al.

Recent synonym: *Pseudocyphellaria perpetua* McCune and Miadlikowska

Common name: Hawaiian specklebelly

Taxonomic note: Moncada et al. (2014), using molecular sequence data of the ITS barcoding locus, revised the treatment of Hawaiian *Pseudocyphellaria*. They describe eight new species and reinstate others. In doing so, they establish *P. hawaiiensis* as having nomenclatural priority over *P. perpetua*.

FIELD SUMMARY — A brown foliose lichen with a yellow medulla, yellow soralia, yellow pseudocyphellae on the lower surface, and a cyanobacterial photobiont. Epiphytic.

Diagnostic characters — *Pseudocyphellaria hawaiiensis* can be distinguished by its (1) yellow pseudocyphellae, (2) yellow medulla, and (3) yellow, mostly marginal soralia.

Description

THALLUS — foliose, to 10 cm broad, loosely attached to the substrate; upper surface brown or gray, glabrous, often with a glossy appearance; medulla yellow; lower surface pale and covered with cream-colored tomentum dotted with yellow pseudocyphellae. —soredia yellow, round or elongate, more frequent on slightly raised lobe margins than laminal. —isidia absent. —rhizines and cilia absent. —pseudocyphellae yellow. —pycnidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — unknown.

CHEMISTRY — cortex K-, KC-, P-, UV+ pale blue; medulla K+ deep yellow, KC+ orange, K+ orange, P+ orange, UV- or UV+ dark orange; soralia K+ yellow, UV+ dark orange.

Ecology — *Pseudocyphellaria hawaiiensis* is known from conifers, hardwoods, and ericaceous shrubs, usually in hypermaritime locations in Oregon but infrequently found inland.

Distribution — *Pseudocyphellaria hawaiiensis* is known from Asia, North America, and Hawaii. In western North America, *P. hawaiiensis* is known from Alaska, Washington, Oregon, and California. In Oregon, *P. hawaiiensis* is reported from Benton, Clatsop, Coos, Douglas, Lane, Lincoln, Linn, and Tillamook counties within the Coast Range, West Cascades, and Willamette Valley ecoregions.

Similar species — In the Pacific Northwest, *Pseudocyphellaria hawaiiensis*, *P. crocata* and *P. mallota* have yellow pseudocyphellae on the lower surface. The medulla of *Pseudocyphellaria hawaiiensis* is yellow, while both *P. crocata* and *P. mallota* have a white medulla. The upper surface of *P. crocata* is smooth, with bright yellow soralia. *Pseudocyphellaria mallota* has sparse tomentum on the upper surface and grayish-brown soralia, often deteriorating to yellow.

References — McCune (2016), Leshner et al. (2003, p. 153).

References with color photos — Moncada et al. (2014), McCune and Geiser (2009, p. 297, as *Pseudocyphellaria perpetua*).

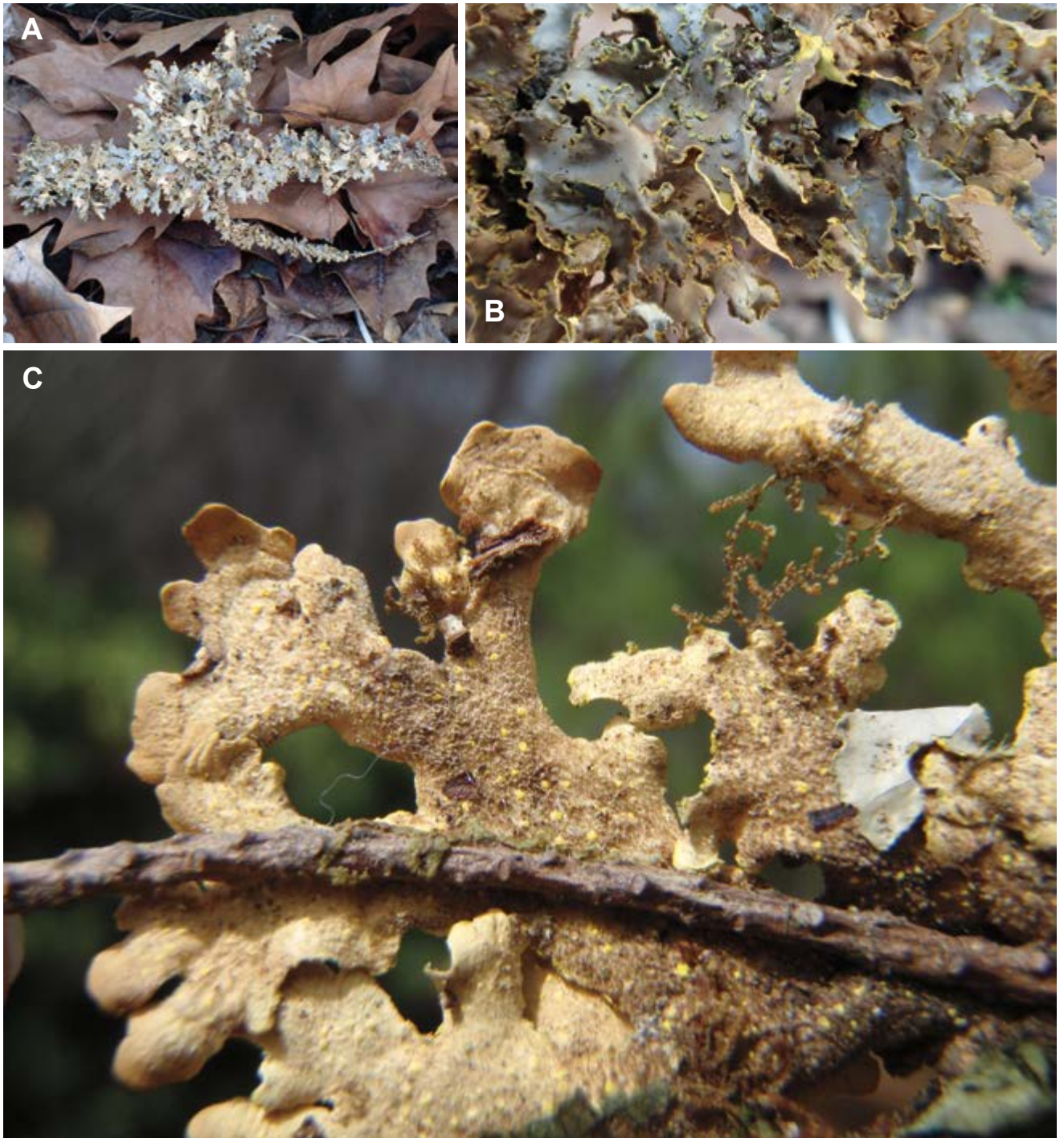


Plate 38. *Pseudocyphellaria hawaiiensis*. A. Thallus. B. Thallus showing yellow medulla and soralia. C. Lower surface. (A–C: Loring Pers. Coll.)

Pseudocyphellaria mallota (Tuckerman) H. Magnusson

Recent synonym: none

Common name: specklebelly

FIELD SUMMARY — A gray to brown foliose lichen with a white medulla, yellow pseudocyphellae on the lower surface, and a cyanobacterial photobiont. Epiphytic.

Diagnostic characters — *Pseudocyphellaria mallota* can be distinguished by its (1) yellow pseudocyphellae, (2) white medulla, (3) tomentum on the upper surface, (4) grayish soredia, often deteriorating to yellowish, and (5) small size.

Description

THALLUS — foliose, up to 4 cm broad; lobes 2–10 mm broad, appearing ragged; upper surface gray to brown, tomentum variable, sparse to marginal or with only scattered hairs; medulla white; lower surface with cream-colored tomentum dotted by yellow pseudocyphellae. —soredia granular to isidioid, whitish or grayish, sometimes deteriorating to yellow. —isidia absent. —rhizines and cilia absent. —pseudocyphellae yellow. —pycnidia absent. —photobiont cyanobacteria.

APOTHECIA — rare.

CHEMISTRY — cortex K-; medulla K-, KC-, C-, P-, UV-.

Ecology — *Pseudocyphellaria mallota* is known from semi-open habitats in low to mid-elevations, often in areas rich in cyanolichens. It is mostly associated with Douglas-fir and western hemlock stands, but is also found on hardwoods and shrubs. Specimens of *P. mallota* collected in Oregon and Washington tend to be less than 1 cm in diameter.

Distribution — *Pseudocyphellaria mallota* is known from North and South America. In western North America, *P. mallota* is known from British Columbia, Washington, and Oregon. In Oregon *P. mallota* is known from Benton, Douglas, Lane, Lincoln, Linn, and Yamhill counties within the Coast Range and West Cascades ecoregions.

Similar species — See *Pseudocyphellaria hawaiiensis* for a discussion of similar species.

References with color photos — McCune and Geiser (2009, p. 296).



Plate 39. Pseudocyphellaria mallota. A. Thallus upper surface. B. Close-up of lower surface with pseudocyphellae. C. Close-up of upper surface with tomentum. D. Thallus lower surface. (A–D: Loring Pers. Coll.)

Pseudocyphellaria rainierensis Imshaug

Recent synonym: none

Common name: old-growth specklebelly, Rainier pseudocyphellaria lichen

FIELD SUMMARY — A greenish-gray foliose lichen with lobules, white pseudocyphellae on the lower surface, and a green primary photobiont. Epiphytic.

Diagnostic characters — *Pseudocyphellaria rainierensis* can be distinguished by its (1) pale bluish-green to greenish-gray thallus, (2) white pseudocyphellae on the lower surface, (3) presence of marginal lobules or isidia on large, strap shaped lobes, and (4) combination of green algal photobiont and internal cephalodia.

Description

THALLUS — foliose, loosely attached to the substrate; lobes 0.3–5 cm × 5–12 (20) cm, margins often densely lobulate or isidiate; upper surface pale bluish-green to greenish-gray, rugose; medulla white; lower surface whitish or light brown, tomentose, with white pseudocyphellae. —soredia lacking. —isidia laminal, especially in cortical fissures, elongate or coralloid, sometimes with isidalia. —lobules common. —rhizines and cilia absent. —pseudocyphellae large, white, raised. —pycnidia absent. —photobiont green (*Dictyochloropsis*) with internal cephalodia.

APOTHECIA — rare, reddish-brown, 1–2 mm, with a thalline margin. —spores 1–3-septate, hyaline, fusiform, 30–60 × 5–7 μm.

CHEMISTRY — cortex K+ yellow, KC-, C-, P-, I-, UV-; medulla K-, KC-, C-, P-, I+ blue, UV+ blue-white or UV-.

Ecology — *Pseudocyphellaria rainierensis* is usually associated with older coniferous forests, rarely in younger forests, from 330 to 1,220 feet in elevation. It is often found growing with *Lobaria oregana* in western hemlock or Pacific silver fir plant associations.

Distribution — *Pseudocyphellaria rainierensis* is endemic to western North America where it is known from British Columbia, Washington, and Oregon. In Oregon, *P. rainierensis* is reported from Clackamas, Douglas, Lane, Lincoln, Linn, Marion, Polk, and Tillamook counties within the Coast Range and West Cascades ecoregions.

Similar species — *Lobaria oregana* is similar in size and appearance, but lacks pseudocyphellae.

References with color photos — McCune and Geiser (2009, p. 298), Leshner et al. (2003, p. 159), Brodo et al. (2001, p. 595).

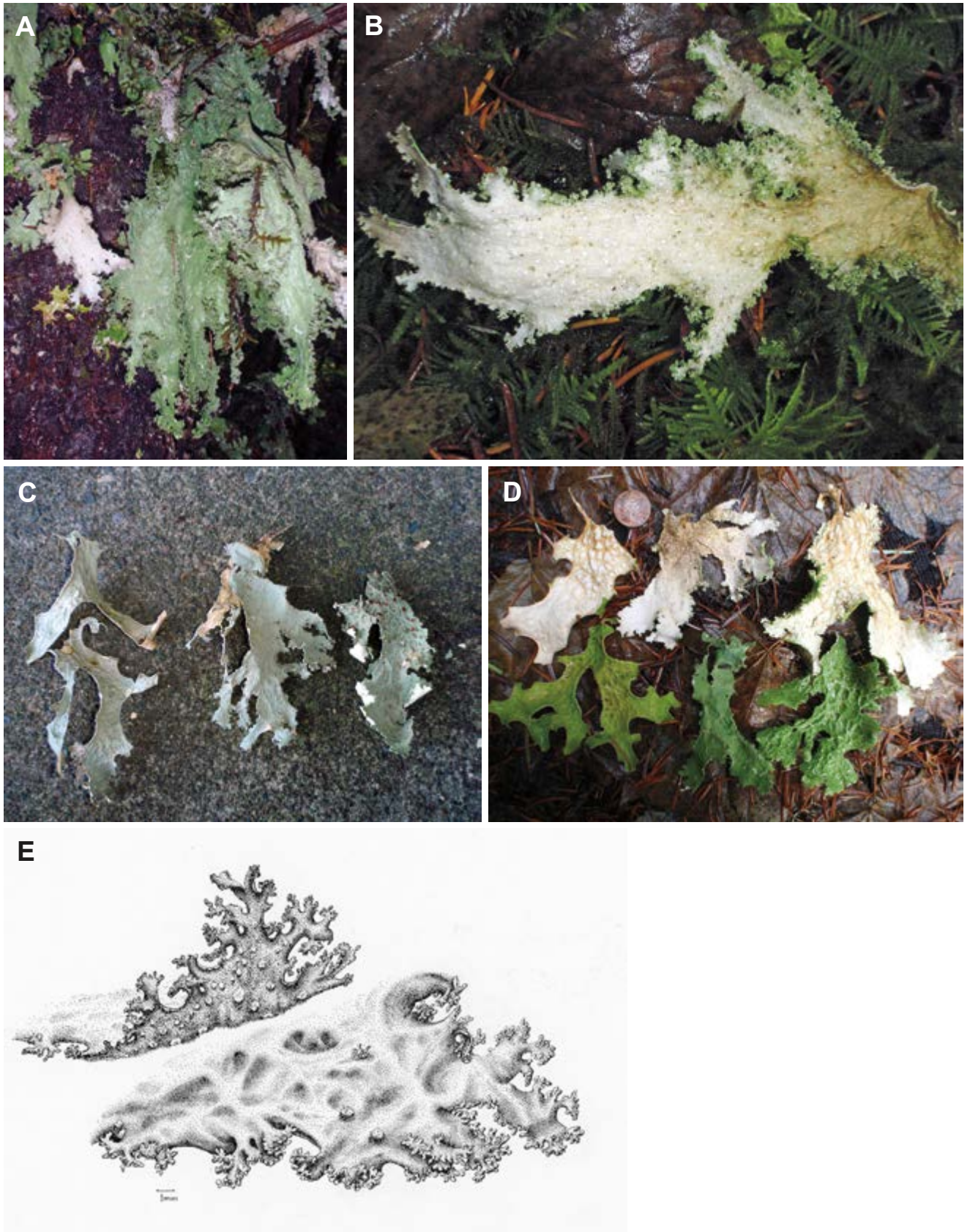


Plate 40. *Pseudocyphellaria rainierensis*. A. Thallus. B. Thallus lower surface. C. *Lobaria pulmonaria*, *Pseudocyphellaria rainierensis*, and *Lobaria oregana* upper surfaces (dry). D. *Lobaria pulmonaria*, *Pseudocyphellaria rainierensis*, and *Lobaria oregana* (wet). E. Mikulin drawing. (A–D: Loring Pers. Coll.)

Ramalina intermedia (Delise) Nylander

Recent synonym: none

Common name: rock ramalina

FIELD SUMMARY — A yellow-green, sorediate, fruticose lichen with flattened branches and a green photobiont. Mostly saxicolous, rarely epiphytic.

Diagnostic characters — *Ramalina intermedia* can be distinguished by its (1) narrow, flattened, solid branches often tapering to curling tips, (2) soralia concentrated near branch apices, (3) negative chemical and UV tests, and (4) mostly saxicolous habitat.

Description

THALLUS — fruticose, 1–3 (5) cm, pale yellow-green, extensively branched; branches flattened to sub-cylindrical, 1–2 mm wide at the base, tapering to narrow (0.5 mm) curled apices; medulla white. —soredia coarsely granular, small, rounded, concentrated at the tips of branches, sometimes laminal, occasionally becoming isidioid, especially at the apices. —isidia absent. —rhizines and cilia absent. —pseudocyphellae sparse and inconspicuous, more or less depressed, often forming soredia —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — rare, subterminal, marginal, thalline, to 3 mm wide, more or less flat and concolorous. —spores 1-septate, $4 \times 10\text{--}12 \mu\text{m}$.

CHEMISTRY — spot tests negative.

Ecology — *Ramalina intermedia* is mostly known from rock cliffs and boulders in shaded conditions. It is also reported as epiphytic in boreal forests and in the Appalachian and Rocky Mountains. The lone Oregon site is reported from under a large overhanging serpentine outcrop.

Distribution — *Ramalina intermedia* is known from Europe and North America. In western North America, *R. intermedia* is known from Alaska, British Columbia, Alberta, Oregon, California, Arizona, Colorado, New Mexico, and Mexico. In Oregon, *R. intermedia* is reported from Josephine County within the Klamath Mountains ecoregion.

Similar species — *Ramalina pollinaria* usually grows on wood and has terminal, labriform soralia that appear to burst from the branch tips. *Ramalina obtusata* has expanded branch tips forming hooded structures over terminal soralia. *Ramalina farinacea* rarely grows on rock, but has oval to elliptical soralia distributed along the margins rather than concentrated at the apices, and has a KC+ yellow cortex.

References — Kashiwadani and Nash III (2004, p. 447), Thomson (1984, p. 378), Bowler and Rundel (1974), Wade (1961), Howe (1914).

References with color photos — Brodo et al. (2001, p. 624).



Plate 41. *Ramalina intermedia*. A. Thallus. B. Close-up of thallus branches. C. Thallus on rock. D. Thallus.
(A–C: Loring Pers. Coll., D: McCune #26634)

Ramalina pollinaria (Westring) Acharius

Recent synonym: none

Common name: chalky *ramalina*

FIELD SUMMARY — A pale green, soorediate, fruticose lichen with flattened branches and a green photobiont. Epiphytic, rarely saxicolous.

Diagnostic characters — *Ramalina pollinaria* can be distinguished by its (1) mostly terminal, labriform soralia, (2) solid thallus, and (3) epiphytic habitat.

Description

THALLUS — fruticose, up to 2 (6) cm, pale green to yellow; branches mostly solid, shiny, 1–3 (6) cm long and 0.5–2 (3) mm wide, cartilaginous, palmately branched, somewhat channeled, narrowing toward the tips but the tips often appearing to “burst” into lip-like soralia. —soredia powdery or granular, rounded to labriform, terminal or occasionally laminal. —isidia absent. —rhizines and cilia absent. —pseudocyphellae absent. —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — rare, near branch tips.

CHEMISTRY — cortex KC+ yellow; medulla K-, KC-, C-, P-, UV+ blue-white.

Ecology — *Ramalina pollinaria* is found in or near wetlands on bark, wood, and rock. In the Pacific Northwest, it is known from spruce in low elevation swamps. Kashiwadani and Nash III (2004) list rock as the primary substrate in Sonoran Desert region.

Distribution — *Ramalina pollinaria* is known from Eurasia, North America, and New Zealand. In western North America, *R. pollinaria* is known from Washington, Oregon, California, Arizona, and New Mexico. In Oregon, *R. pollinaria* is reported from Clatsop, Coos, Curry, Lane, Lincoln, Marion, and Tillamook counties within the Coast Range and West Cascades ecoregions.

Similar species — *Ramalina obtusata* has hollow, perforate branches and soralia beneath inflated, hooded lobe tips rather than the labriform soralia of *R. pollinaria*, and is found mostly east of the Cascade Mountains. *Ramalina farinacea* has mostly marginal soralia and is UV negative. *Ramalina intermedia* is more strictly saxicolous, with narrower branch tips becoming tapered or isidioid.

REFERENCES — Blanchon and Bannister (2004), Kashiwadani and Nash III (2004, p. 450), Thomson (1984, p. 379), Wade (1961).

References with color photos — Sharnoff (2014, p. 193), McCune and Geiser (2009, p. 305), Brodo et al. (2001, p. 629).

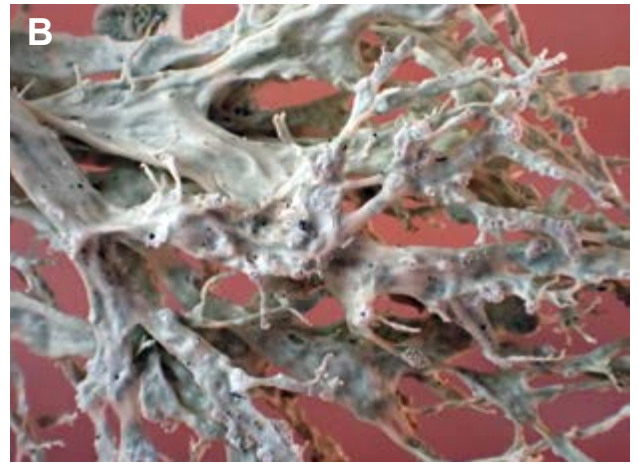


Plate 42. *Ramalina pollinaria*. A. Thallus with labriform soralia at lobe tips. B. Thallus with rounded soralia. C. Rounded soralia. D. Thallus. E. Mikulin drawing. (A–D: McCune #32057)

Solorina spongiosa (Acharius) Anzi

Recent synonym: none

Common name: fringed chocolate chip lichen, socket lichen, blinking owl

FIELD SUMMARY — A foliose lichen consisting of a reduced thallus surrounding the apothecia, and a green photobiont and cephalodia. Terricolous, muscicolous.

Diagnostic characters — *Solorina spongiosa* can be distinguished by its (1) reduced thallus surrounding the apothecia, (2) red-brown, cup-like apothecia, and (3) dark external cephalodia.

Description

THALLUS — scant and fragile, consisting of small squamules and granules around the apothecia, blue-gray to reddish-gray, mixed with *Nostoc* colonies forming cephalodia that are often erect-coralloid; lower surface ecorticate, gray to brown, indistinctly veined, tomentose with clusters of rhizines; cephalodia dark-gray, nodulose to warted, gelatinous when wet and partly buried in the thallus. —soredia and isidia absent. —rhizines simple to more or less branched. —cilia absent. —pycnidia absent. —photobiont green (*Coccomyxa*) with external cephalodia (*Nostoc*).

APOTHECIA — reddish-brown, to 15 mm, lecideine, becoming strongly cup-shaped. —asci 4-spored. —spores 1- or 3-septate, hyaline to brown, ellipsoid, ornamented with rimose ridging made up of triangular and trapezoidal depressions, (20) 30–50 (55) × (15) 18–24 (26) μm.

CHEMISTRY — spot tests negative.

Ecology — *Solorina spongiosa* is found on tundra sod, sandy soils and moss mats on calcareous seeps or peaty streambanks in arctic-alpine, boreal, and montane habitats. In Oregon, it occurs on calcareous substrates.

Distribution — *Solorina spongiosa* is known from Eurasia, Iceland, Greenland, North and South America, New Zealand, and Antarctica. In western North America *S. spongiosa* is known from Alaska, British Columbia, Oregon, California, Montana, Nevada, Utah, Colorado, and Arizona. In Oregon, *S. spongiosa* is reported from Wallowa County within the Blue Mountains ecoregion.

Similar species — *Solorina spongiosa* is unique. Other members of the genus that are known from the Pacific Northwest generally have well-developed lobes. *Solorina bispora* also has a poorly developed thallus, but has 2 large spores (60–104 × 34–40 μm) per ascus and is known from arctic-alpine habitats in the Rocky Mountains.

References — Vitikainen (2012, p. 131), Ryan and Vitikainen (2004, p. 506), McCune and Geiser (2009, p. 312), Thomson and Thomson (1984), Thomson (1984, p. 388).

References with color photos — Nordic Lichen Flora (2012, p. 207), Brodo et al. (2001, p. 656).



Plate 43. *Solorina spongiosa*. A–B. Apothecia with reduced granular thallus. C. Apothecia. (A–C: McCune #10462)

Stereocaulon spathuliferum Vainio

Recent synonym: *Stereocaulon botryosum* var. *spathuliferum* (Vainio) I.M. Lamb

Common names: chalk foam, snow lichen

FIELD SUMMARY — A cream-colored, fruticose lichen consisting of solid stalks with flattened apical projections (phyllocladia), and forming dense cauliflower-like cushions. Saxicolous.

Diagnostic characters — *Stereocaulon spathuliferum* can be distinguished by its (1) saxicolous habitat, (2) presence of soredia, and (3) P+ orange medullary reaction.

Description

THALLUS — fruticose, of two types. Primary thallus disappearing. Secondary thallus of white to cream to grayish-cream, fruticose pseudopodetia firmly attached to the substrate, forming dense, shrubby cushions 2–3 (5) cm tall with spreading banches; branches glabrous, bearing small, granular phyllocladia grading into soredia; external cephalodia conspicuous in stipitate, cauliflower-like clumps to 2+ mm, brownish, grayish, or with a bluish hue; cortex mostly lacking. —soredia abundant, granular, mostly apical on the ventral surfaces of phyllocladia. —isidia absent. —pycnidia absent. —photobiont green (*Trebouxia*) with external cephalodia (*Stigonema* or *Nostoc*). McCune and Geiser (2009) and Goward (1999) list *Stigonema* as the photobiont; Thomson (1984) and Oset (2014) suggest *Nostoc*.

APOTHECIA — at branch apices, convex, to 3 mm, uncommon. —spores unknown. At the generic level; elongate, septate, (12) 16–100 (200) × 2–7 μm.

CHEMISTRY — cortex K+ yellow or red; medulla K+ yellow or orange, P+ orange.

Ecology — *Stereocaulon spathuliferum* is known from noncalcareous rock in cool, moist, somewhat sheltered habitats, often north-facing cliffs, from 3,000 to 5,000 feet in elevation.

Distribution — *Stereocaulon spathuliferum* is known from Eurasia, Iceland, Greenland and North America. In western North America, *S. spathuliferum* is known from Alaska, British Columbia, Washington and Oregon. In Oregon *S. spathuliferum* is reported from Lane, Linn and Marion counties within the West Cascades ecoregion.

Similar species — *Stereocaulon vesuvianum* is also P+ orange, saxicolous, and can be sorediate, but has larger, dark olive-green phyllocladia with strongly contrasting, pale, nearly white margins.

References — Oset (2014, p. 52), Goward (1999, p. 237), Thomson (1984, p. 424).

References with color photos — McCune and Geiser (2009, p. 321).

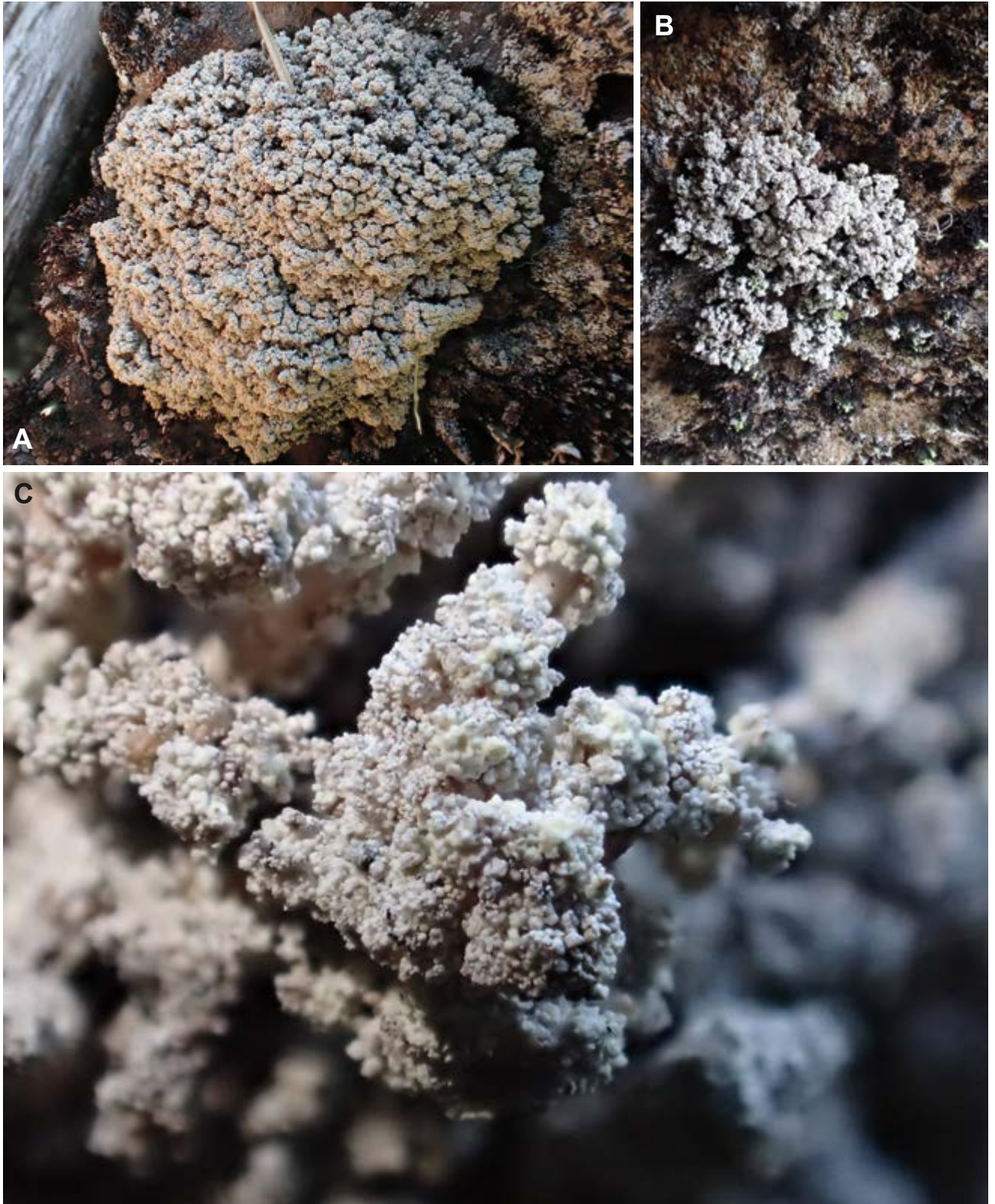


Plate 44. *Stereocaulon spathuliferum*. A–B. Pseudopodetium. C. Close-up of branch apex. (A–C: Loring Pers. Coll.)

Sticta arctica Degelius

Recent synonym: none

Common name: arctic moon lichen

FIELD SUMMARY — A brown, lobulate, foliose lichen, with crater-like pores (cyphellae) on the lower surface, often with a fish odor and a cyanobacterial photobiont (*Nostoc*). Muscicolous, terricolous, or saxicolous.

Diagnostic characters — *Sticta arctica* can be distinguished by its (1) brown thallus, (2) cyphellae on the lower surface, and (3) lack of isidia or soredia.

Description

THALLUS — foliose, 2–5 cm broad, brown, smooth, lobes 2–5 (12) mm wide, margins lobulate, often crisped and turned up; upper surface smooth, brown; lower surface black centrally with lighter brown margins, tomentose, cyphellae sparse. —soredia and isidia absent. —lobules marginal, 0.1–0.5 mm wide, variably abundant. —rhizines simple or branched. —cilia absent. —pycnidia absent. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — unknown.

CHEMISTRY — spot tests negative.

Ecology — *Sticta arctica* grows on mossy rocks and alpine sod at exposed rocky coastal sites. It is primarily an arctic species of moist and dry tundra. However, in northwestern Washington it is found on rocky ledges and mossy soil near the edges of marine beaches. In northwestern Oregon (Saddle Mountain), it is reported from a moss-covered basalt outcrop at 2,950 feet in elevation.

Distribution — *Sticta arctica* is known from Asia and North America. In western North America, *S. arctica* is known from Alaska, British Columbia, Washington, and Oregon. In Oregon, *S. arctica* is reported from Clatsop County within the Coast Range ecoregion.

Similar species — *Sticta limbata* has soredia, *S. weigeli* has marginal isidia, and *S. fuliginosa* has laminal isidia. *Sticta arctica* lacks both soredia and isidia.

References — Lesher et al. (2003, p. 175), Thomson (1984, p. 432).

References with color photos — McCune and Geiser (2009, p. 326).

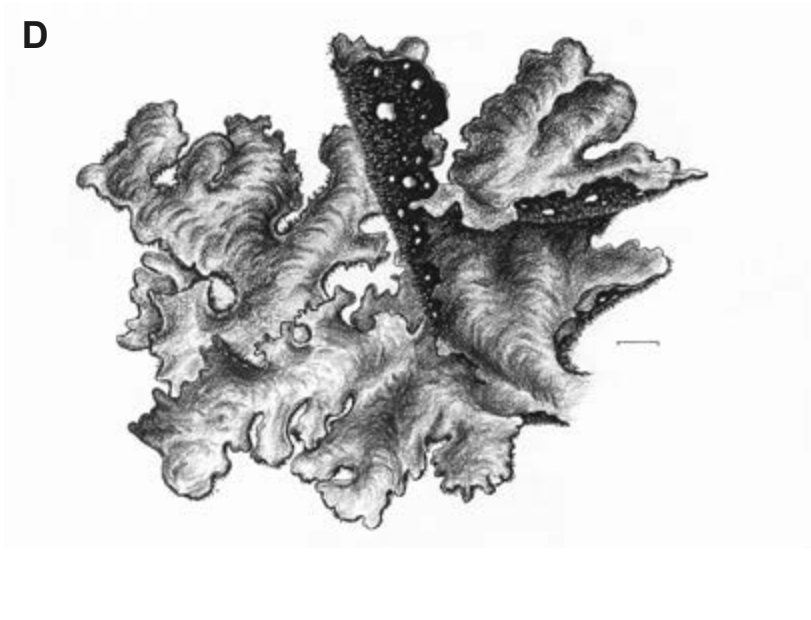


Plate 45. *Sticta arctica*. A. Thallus. B. Lobules. C. Lower surface with cyphellae. D. Mikulin drawing. (A-C: Derr #881)

Sticta weigelia (Acharius) Vainio

Recent synonym: none

Common name: Weigel's moon lichen

FIELD SUMMARY — A brownish, isidiate, foliose lichen with crater-like pores (cyphellae) on the lower surface, often with a fish odor and a cyanobacterial photobiont (*Nostoc*). Epiphytic, muscicolous, sometimes saxicolous.

Diagnostic characters — *Sticta weigelia* can be distinguished by its (1) brown thallus with cylindrical, marginal isidia, (2) lack of soredia, and (3) cyphellae on the tomentose, lower surface.

Description

THALLUS — foliose, 2–12 cm broad, brown to gray, sometimes blackened when moist, pale gray to olive when dry, margins free, ascending, isidiate, lobes laciniate; upper surface smooth; medulla whitish to yellowish; lower surface brown, tomentose, with sparse, prominent cyphellae to 0.8 (1.0) mm. —soredia absent. —isidia abundant, marginal, cylindrical, often branching, dense and more or less continuous. —rhizines occasional, tufted. —cilia absent. —pycnidia scattered, occasional or rare, laminal, prominent, reddish-brown to black. —photobiont cyanobacteria (*Nostoc*).

APOTHECIA — unknown.

CHEMISTRY — spot tests negative or medulla K+ yellow.

Ecology — *Sticta weigelia* is associated with older coniferous forests in the Pacific Northwest. It grows on bark, wood, and moss, usually on conifers and occasionally on moss-covered rock. Ours may be an undescribed species or *Sticta beauvoisii*.

Distribution — *Sticta weigelia* is known from Asia, Africa, North and South America, and Australia. In western North America, *S. weigelia* is known from Alaska, British Columbia, Washington, Oregon, and California. In Oregon, *S. weigelia* is reported from Douglas, Lane, Lincoln, Linn, Klamath and Marion counties within the Coast Range, West Cascades, and Willamette Valley ecoregions.

Similar species — See *Sticta arctica* for a discussion of similar species.

References — Galloway (2006), Thomson (1986, p. 432).

References with color photos — McCune and Geiser (2009, p. 329).

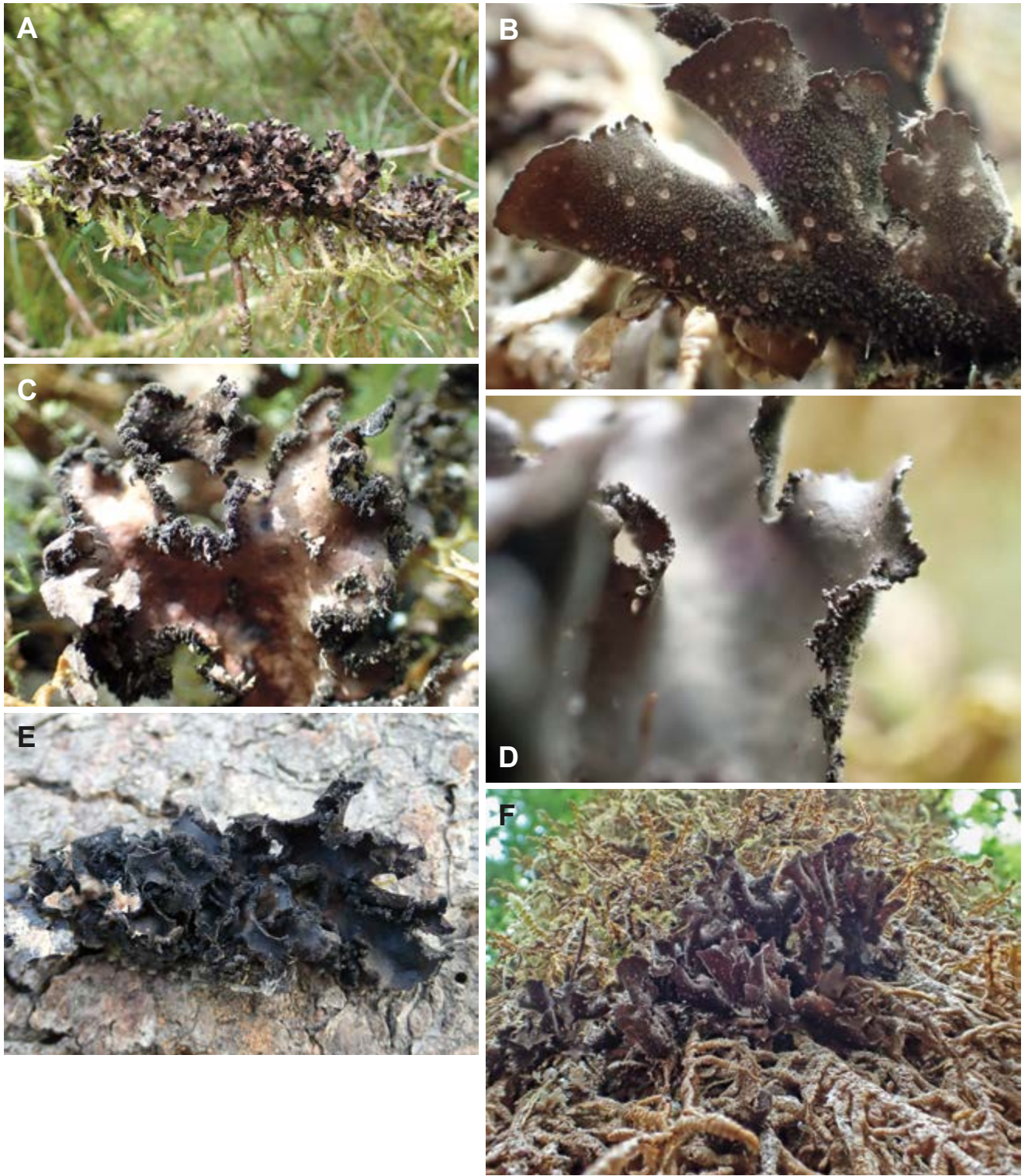


Plate 46. *Sticta weigeli*. A. Thallus. B. Lower surface with cyphellae. C. Thallus with isidiate margins. D. Isidiate margins. E–F. Thallus. (A–E: Loring Pers. Coll.)

Teloschistes flavicans (Swartz) Norman

Recent synonym: none

Common name: powdered orange bush lichen

FIELD SUMMARY — An orange, sorediate fruticose lichen with a green photobiont. Epiphytic, muscicolous or saxicolous.

Diagnostic characters — *Teloschistes flavicans* can be distinguished by its (1) orange-colored thallus, (2) presence of soredia, (3) fruticose habit, and (4) coastal habitat.

Description

THALLUS — fruticose, tufted, 2–8 cm, pale yellow to reddish-orange or rarely pale gray, moderately branched, with slender, mostly terete branches up to 0.6 (1) mm wide, often narrower; apices and side branches with pointed tips lacking a photobiont. —soredia round, yellow. —isidia absent. —cilia present apically and at branching points. —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — not seen in Oregon specimens; dark reddish-orange in southwestern specimens.

CHEMISTRY — cortex K+ purple; medulla K-, KC-, C-, P-.

Ecology — *Teloschistes flavicans* is known from exposed coastal headland forests on bark and wood of Sitka spruce, shore pine, and Hooker's willow in the coastal fog belt. In southern and Baja California, it occurs on coastal scrub near sea level on trees, bryophytes, and rock.

Distribution — *Teloschistes flavicans* is known from Eurasia, Africa, North and South America, Australia, and New Zealand. In western North America, *T. flavicans* is known from Oregon, California, Nevada, and Mexico. In Oregon, *T. flavicans* is reported from Coos, Curry, Lincoln and Tillamook counties within the Coast Range ecoregion.

Similar species — The orangish fruticose habit of *Teloschistes flavicans* is unique amongst the coastal lichens in the Pacific Northwest. Frödén et al. (2004) remark, morphologically and chemically *T. flavicans* is variable and numerous infraspecific taxa have been described. *Seiophora contortuplicata*, formerly in the genus *Teloschistes*, has a smaller thallus of less than 2 (4) cm and occurs in crevices of calcareous rock east of the Cascade Mountains from intermediate to high elevations.

References — Frödén et al. (2004, p. 528), Sanders (1993), Hale and Cole (1988, p. 171), Honeger (1986).

References with color photos — Sharnoff (2014, p. 202), McCune and Geiser (2009, p. 332), Leshner et al. (2003, p. 181), Brodo et al. (2001, p. 675), Hale and Cole (1988, plate 10).

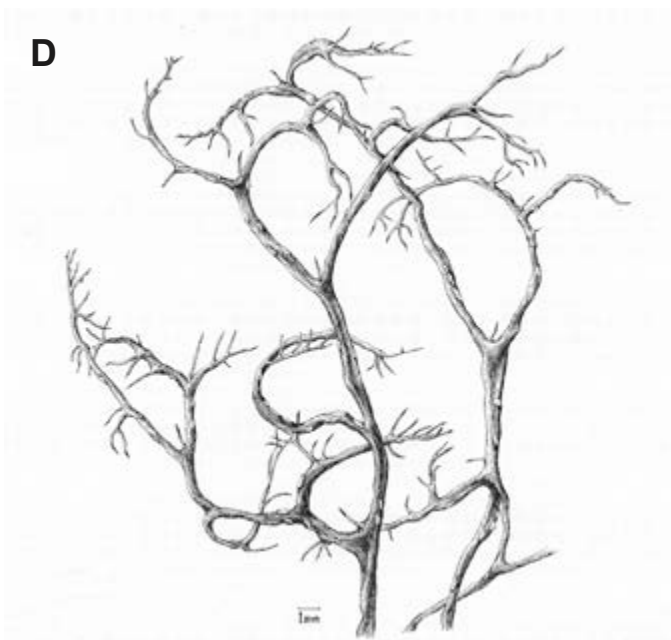
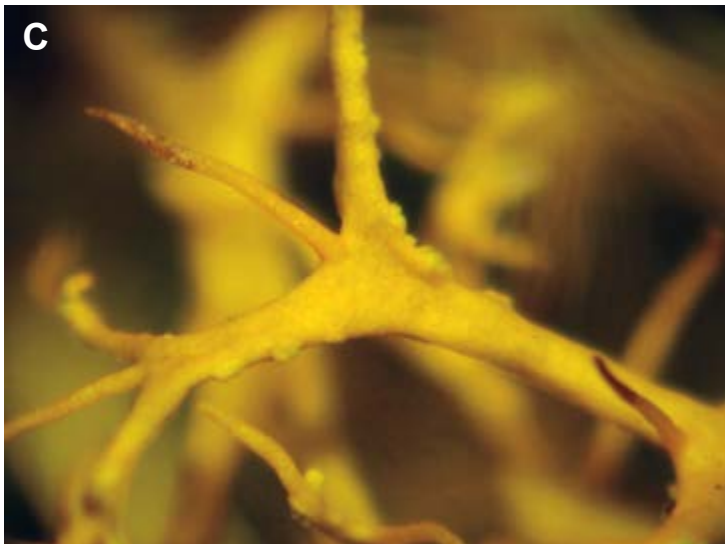


Plate 47. *Teloschistes flavicans*. A–B. Thallus. C. Soralia. D. Mikulin drawing. (A–C: Loring Pers. Coll.)

Tholurna dissimilis (Norman) Norman

Recent synonym: none

Common name: arboreal urn lichen

FIELD SUMMARY — A mazaediate, grayish, fruticose lichen with one ascoma per podetium and a green photobiont. Epiphytic, rarely saxicolous.

Diagnostic characters — *Tholurna dissimilis* can be distinguished by its (1) hollow, unbranched, digitate podetia terminating in an apothecium, (2) mazaediate ascocarp, (3) pale gray or greenish-gray thallus, and (4) large, spirally ornamented spores.

Description

THALLUS — dwarf fruticose, 1.5–2.5 cm, dark olivaceous to brownish-gray, forming rounded to hemispherical cushions, consisting of densely clustered, radially protruding digitate podetia with one ascoma at the apex. Primary thallus crustose, verrucose to irregularly thickened, surrounding the base of the podetium. Secondary thallus of podetia, strongly furrowed with gray ridges, 1–3 (5) mm high and mostly less than 1 mm wide. —soredia and isidia absent. —rhizines and cilia absent. —pycnidia globose to pear-shaped, with a pigmented ostiole. —photobiont green (*Protococcus* or *Trebouxia*).

APOTHECIA — mazaediate, terminal, sessile, black, epruinose, cup-shaped, 0.4–0.6 × 0.3–0.6 mm. —asci 8-spored. —spores 1-septate, dark brown, constricted at septum, thick-walled with spiral ornamentation, (16) 17–20 (21) × (8) 9–10 µm.

CHEMISTRY — spot tests negative, except P+ pale yellow diffusion onto paper.

Ecology — *Tholurna dissimilis* is known from small branches and twigs of subalpine fir, Engelmann spruce and Douglas-fir, but is occasionally found on hardwoods and rarely on rock. It typically occurs on windswept ridges in the upper montane and subalpine zones up to timberline, but occasionally at low to mid elevations. [Tibell \(1999\)](#) adds, in northern Europe it occurs on bird-manured twigs in tops of isolated low shrubby spruce trees above the timberline, and also in the top of higher spruce trees in bogs from 900 to 3,300 feet in elevation.

Distribution — *Tholurna dissimilis* is known from Eurasia and North America. In western North America, *T. dissimilis* is known from British Columbia, Washington, Oregon and California. In Oregon, *T. dissimilis* is reported from Clackamas, Jefferson, Lane, Linn and Marion counties within the East and West Cascades ecoregions.

Similar species — *Tholurna dissimilis* is unique and easily distinguished by the dactyliform, cushion-like thallus with sessile, mazaediate ascomata situated apically on digitate podetia.

References — Tibell (1999, p. 70), Otto (1964).

References with color photos — McCune and Geiser (2009, p. 335), Leshner et al. (2003, p. 189), Brodo et al. (2001, p. 681), Nordic Lichen Flora (1999, p. 91).

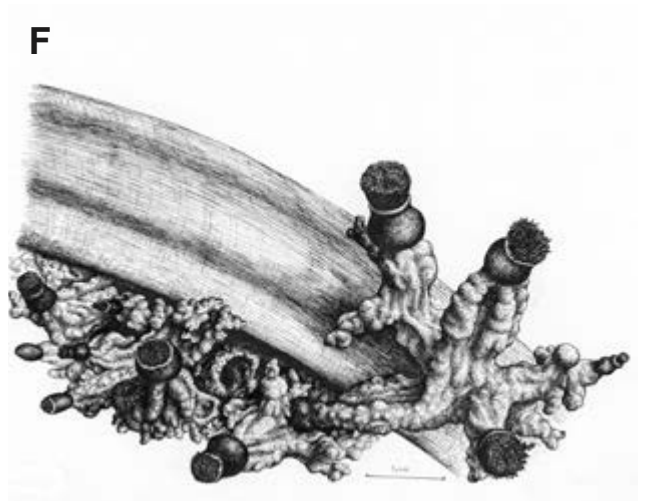
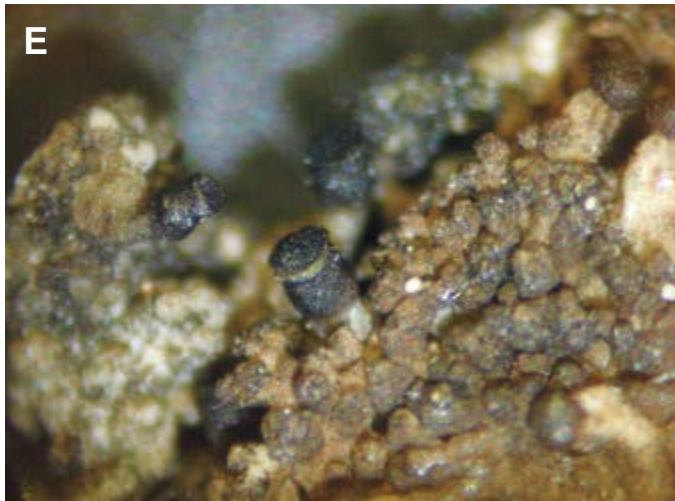
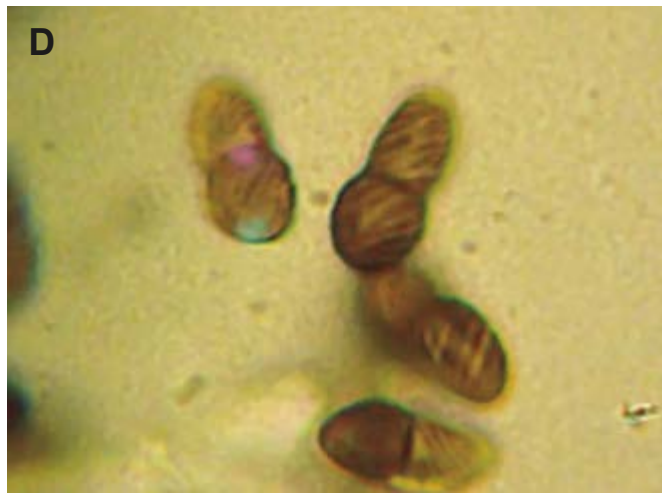
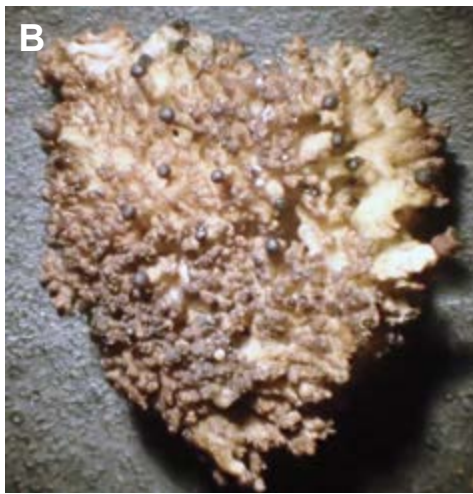


Plate 48. *Tholurna dissimilis*. A. Podetium. B–C. Podetia. D. Spirally-ornamented spores. E. Mazaedia. F. Mikulin drawing. (A–E: Loring Pers. Coll.)

Umbilicaria hirsuta (Swartz) Acharius

Recent synonym: none

Common name: hairy navel lichen

FIELD SUMMARY — A pale brown, umbilicate, foliose lichen with soredia and a green photobiont. Saxicolous.

Diagnostic characters — *Umbilicaria hirsuta* can be distinguished by its (1) umbilicate habit and (2) presence of soredia.

Description

THALLUS — foliose, umbilicate, 2– 5 (12) cm broad, rounded, lobate to lacerate, margins sometimes curling under; upper surface pale brown or gray, paler centrally, smooth initially and becoming rough-textured with small cracks leading to disintegration of the cortex; medulla white; lower surface pale to dark, usually darker near the umbilicus. —soredia powdery, diffuse, marginal, arising from the disintegration of the upper cortex. —isidia absent. —rhizines pale to dark, sparsely branched. —cilia absent. —pycnidia unknown. —photobiont green (*Trebouxia*).

APOTHECIA — more often near the margins, black, sessile to stipitate, lecideine, concentrically ridged, to 2 mm, rare. —asci 8-spored. —spores simple, hyaline, ellipsoid, 10–14 × 4–8 μm.

CHEMISTRY — K-, C+ red, KC+ red, P-.

Ecology — *Umbilicaria hirsuta* is known from sheltered non-calcareous rock faces. It has also been collected in Kamchatka from boulders covered in bird guano in an open riparian environment, where it is said to be nitrophilic.

Distribution — *Umbilicaria hirsuta* is known from Eurasia and North America. In western North America, *U. hirsuta* is known from Alaska, Washington, Oregon, California, Montana, and Colorado. In Oregon, *U. hirsuta* is reported from Jackson County within Klamath Mountains and West Cascades ecoregions.

Similar species — *Umbilicaria hirsuta* is the only sorediate *Umbilicaria* species in North America. *Peltula euploca* is also sorediate and umbilicate, but has a cyanobacterial photobiont and is generally smaller (3–10 mm).

References — Davydov et al. (2011), Hestmark (2004, p. 552), Codogno et al. (1989), Hale and Cole (1988, p. 117), Thomson (1984, p. 450), Kershaw (1961).

References with color photos — McCune and Geiser (2009, p. 346), Kofranek and McCune (2008).



A



B

Plate 49. *Umbilicaria hirsuta*. A. Thalli lower and upper surfaces. B. Soredia. (A-B: Loring Pers. Coll.)

Umbilicaria nodulospora McCune et al.

Recent synonym: none

Common name: rock tripe

FIELD SUMMARY — A grayish, umbilicate, foliose lichen with a green photobiont. Saxicolous.

Diagnostic characters — *Umbilicaria nodulospora* can be distinguished by its (1) grayish brown color, (2) umbilicate habit, (3) angular to stellate, ridged juvenile apothecia, (4) rhizinate lower surface, and (5) asymmetric, nodulose ascospores.

Description

THALLUS — foliose, umbilicate, 1–2 (3) cm broad, often dividing as it expands; upper surface brown to gray-brown, with variable grayish pruina, often darker gray toward the umbo, matte to shiny, smooth to broadly areolate and cracked in a reticulate pattern, cracks often deep and readily dividing the thallus, submarginal areas often minutely perforate, margins entire to irregularly lacerate or lobulate; lower surface smooth to finely papillose or verrucose, usually with a dense mat of rhizines or occasionally without rhizines or trabeculae which exposes the papillae on the lower cortex. —soredia and isidia absent. —rhizines usually a dense mat, parallel or tangled over portions or all of lower surface, often interspersed with brown to black trabeculae. —cilia absent. —pseudopodia occasional. —photobiont green (*Trebouxia*).

APOTHECIA — black, sessile, lecideine, concentrically ridged, angular at first but becoming rounder and convex with age, to 1.2 (2.0) mm. —asci 8-spored. —spores simple, hyaline, ellipsoid, with one or two nodules or bulges off to the sides of the apices, 10–13 × 6–8 μm.

CHEMISTRY — unknown.

Ecology — *Umbilicaria nodulospora* is known from basalt, especially lava beds, from central Oregon to northeastern California. Most collections are from steep, cooler, north-facing slopes.

Distribution — *Umbilicaria nodulospora* is known from North America. In western North America, *U. nodulospora* is known from Oregon and California. In Oregon, *U. nodulospora* is reported from Crook, Klamath, and Lake counties within the East Cascades and Blue Mountains ecoregions.

Similar species — *Umbilicaria torrefacta* has marginal perforations and trabeculae on the lower surface, but neither character is as pronounced in *U. nodulospora*. *Umbilicaria torrefacta* and *U. americana* are both rhizinate and found on a variety of igneous rock types, but are cream to gray above and black and sooty below (thalloconidia present). Additionally, *U. americana* lacks trabeculae on the lower surface. All of these species have symmetrical spores, vs. nodulose spores of *U. nodulospora*.

References with color photos — McCune et al. (2014).

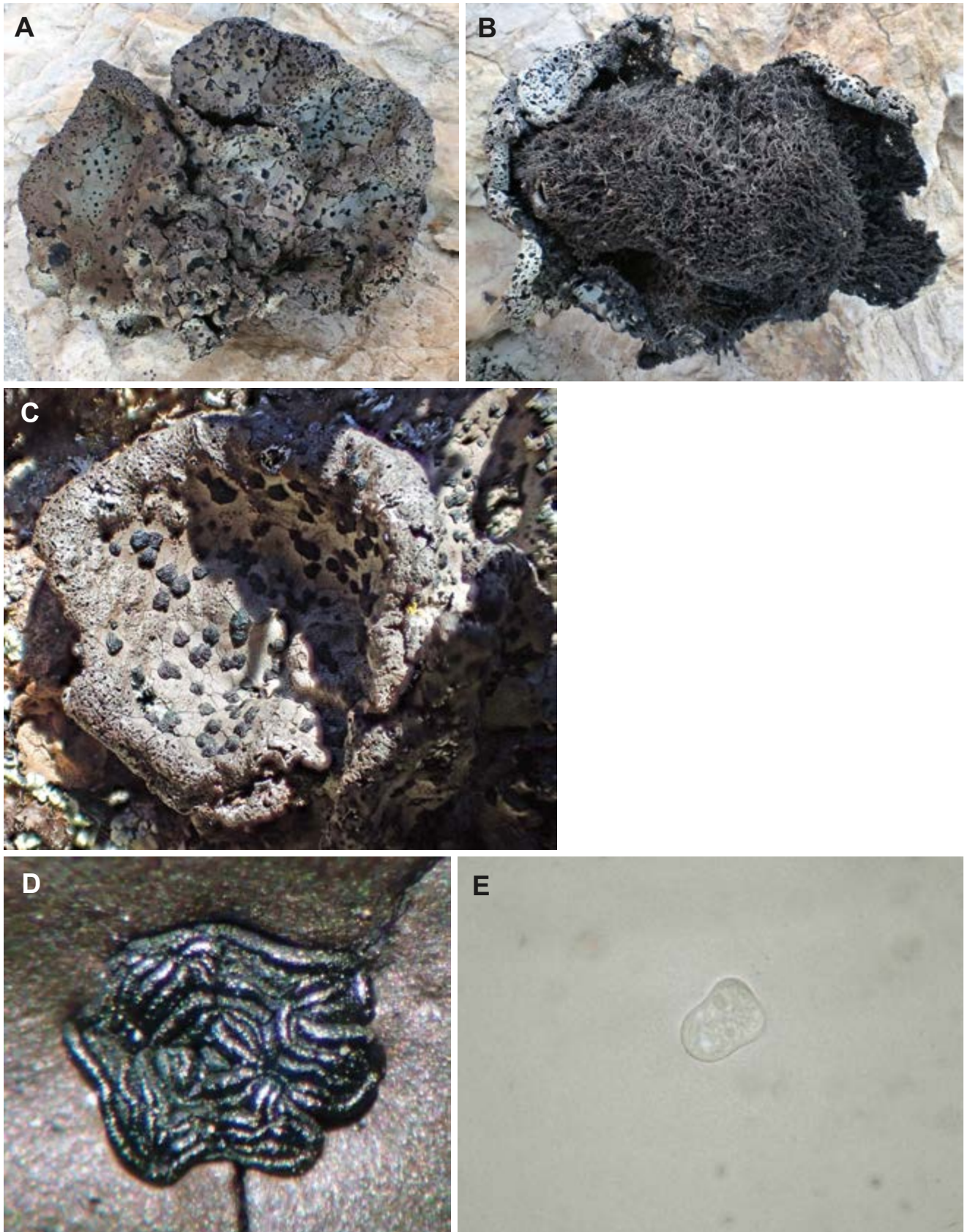


Plate 50. *Umbilicaria nodulospora*. A. Thallus upper surface. B. Thallus lower surface. C. Thallus with apothecia. D. Apothecium. E. Nodulose ascospore. (A–E: Loring Pers. Coll.)

Umbilicaria phaea var. *coccinea* Llano

Recent synonym: none

Common name: lipstick lichen

FIELD SUMMARY — An orange-red, umbilicate, foliose lichen with a green photobiont. Saxicolous.

Diagnostic characters — *Umbilicaria phaea* var. *coccinea* can be distinguished by its (1) bright red upper surface and (2) umbilicate habit.

Description

THALLUS — foliose, umbilicate, 1–3 (5) cm broad, round to somewhat roundly lobate, margin generally entire; upper surface red, orange-red, or brick red, shiny, mostly smooth but irregularly, lightly cracked; medulla white; lower surface dark brown to black, papillose. —soredia and isidia absent. —rhizines usually absent, occasionally sparse. —cilia absent. —pycnidia unknown. —photobiont green (*Trebouxia*).

APOTHECIA — black, common, sessile to immersed, lecideine, concentrically ridged, round, angular, or stellate, to 2.5 mm. —asci 8-spored. —spores simple, hyaline to light brown, ellipsoid, 8–16 × 4–9 μm.

CHEMISTRY — unknown.

Ecology — *Umbilicaria phaea* var. *coccinea* is known from exposed to shaded rock outcrops, boulders, and talus at low to middle elevations, where it often grows intermixed with the much more common and widespread *Umbilicaria phaea* var. *phaea*.

Distribution — *Umbilicaria phaea* var. *coccinea* is known from North America. In western North America, *U. phaea* var. *coccinea* is known from Washington, Oregon, and California. In Oregon, *Umbilicaria phaea* var. *coccinea* is reported from Jackson and Klamath counties within the Klamath Mountains and East Cascades ecoregions.

Similar species — The red upper surface of *Umbilicaria phaea* var. *coccinea* is unique and separates it from all other umbilicate lichens.

References with color photos — Sharnoff (2014, p. 127), McCune and Geiser (2009, p. 350).



Plate 51. *Umbilicaria phaea* var. *coccinea*. A–B. Thallus. C. Thalli. (A–C: Loring Pers. Coll.)

Umbilicaria proboscidea (Linnaeus) Schrader

Recent synonym: none

Common names: greater salted rock tripe, netted rock tripe, elephant rock tripe

FIELD SUMMARY — A grayish-brown, umbilicate, foliose lichen with a reticulately-ridged upper surface and a green photobiont. Saxicolous.

Diagnostic characters — *Umbilicaria proboscidea* can be distinguished by its (1) coarsely reticulately-ridged, white-pruinose upper surface, (2) smooth gray or tan lower surface lacking trabeculae and thalloconida, with or usually without rhizines, and (3) concentrically ridged apothecia.

Description

THALLUS — foliose, umbilicate, 3–6 (10) cm broad, round to roundly lobate, margin entire to somewhat lacerate or occasionally perforate; upper surface gray, grayish-brown, or dark brown, with a network of coarse ridges, white-pruinose especially near the umbo; medulla white; lower surface gray to tan, smooth, with gray pruina mostly near the margins, lacking thalloconidia. —soredia and isidia absent. —rhizines uncommon, sparse. —cilia absent. —pycnidia unknown. —photobiont green (*Trebouxia*).

APOTHECIA — black, common, sessile to substipitate, lecideine, concentrically ridged, round, flat to convex, median size 1.7 mm. —asci 8-spored. —spores simple, hyaline, ellipsoid, 10–17 × 3.5–7 µm.

CHEMISTRY — K-, C+ red, KC+ red, P-, or P+ yellow-orange in some Alaskan specimens (Thomson, 1984).

Ecology — *Umbilicaria proboscidea* is known from exposed acidic rocks, on rock slides, talus slopes or rock outcrops, in arctic, boreal alpine and subalpine habitats. It is known from serpentine rock in southern Oregon and northern California. In general, it replaces *U. krascheninnikovii* north of the Canadian-United States border.

Distribution — *Umbilicaria proboscidea* is known from Europe, Greenland, and North America. In western North America, *U. proboscidea* is known from Alaska, British Columbia, Washington, Oregon, California, and Wyoming. In Oregon, *U. proboscidea* is reported from Baker, Jackson, and Josephine counties within the Blue Mountains and Klamath Mountains ecoregions.

Similar species — Other species with frosted reticulate ridges on the upper surface include *Umbilicaria krascheninnikovii* and *U. virginis*. *Umbilicaria krascheninnikovii* is smaller, thicker, more uniformly pale on the lower surface, always lacks rhizines, and has apothecia with a central sterile button. *Umbilicaria virginis* usually has pinkish rhizines and apothecia with a central sterile button. *Umbilicaria rigida* also has a reticulate-ridged, white pruinose upper surface but that species has smooth apothecial disks rather than the concentrically-ridged apothecia of *U. proboscidea*.

References — Thomson (1984, p. 456).

References with color photos — McCune and Geiser (2009, p. 337, apothecia), Brodo et al. (2001, p. 707), Vitt et al. (1988, p. 242).

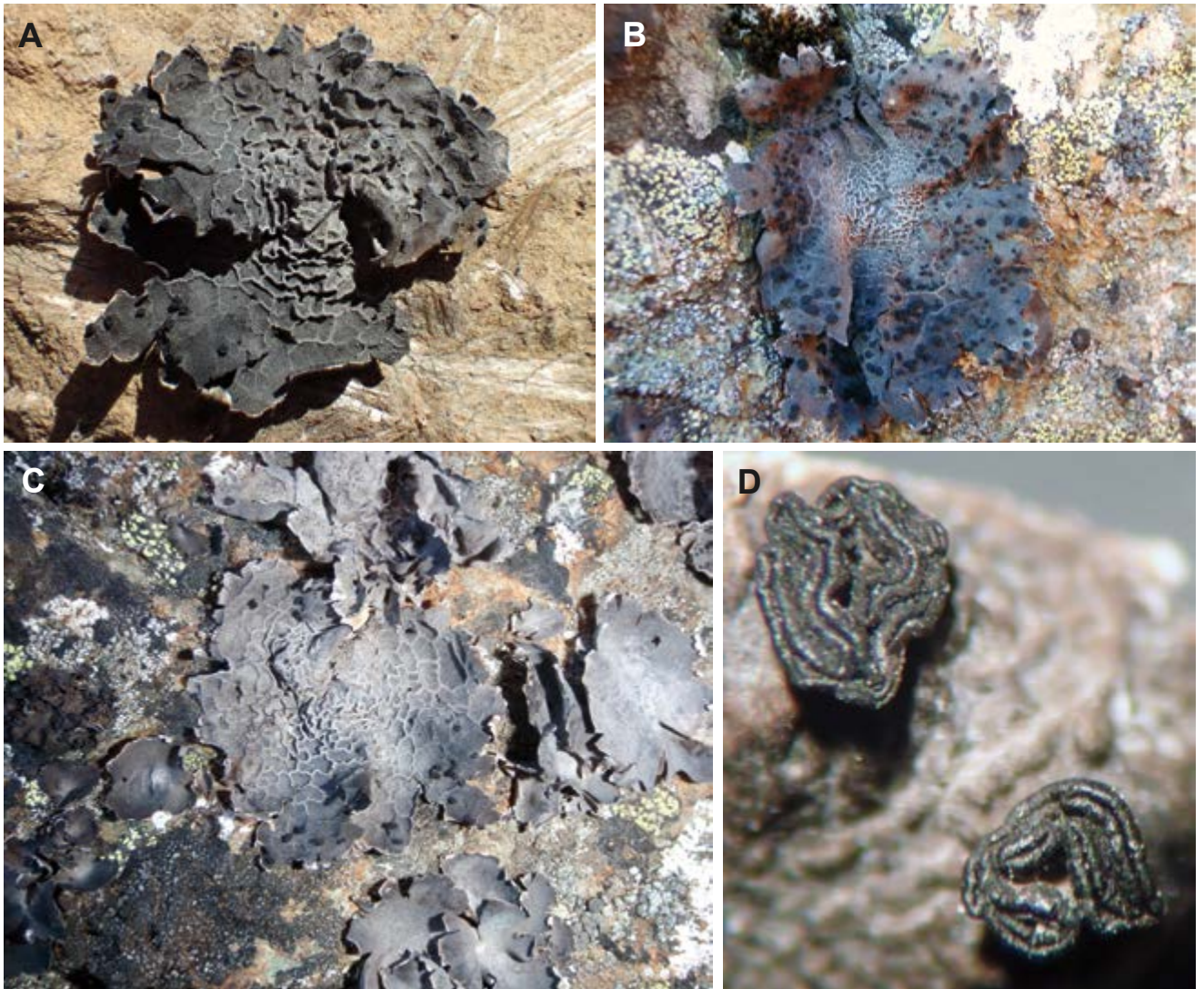


Plate 52. Umbilicaria proboscidea. A–B. Thallus upper surface. C. Thalli upper surface. D. Apothecia. (A–D: Loring Pers. Coll.)

Umbilicaria rigida (Du Rietz) Frey

Recent synonym: *Agyrophora rigida* (Du Rietz) Llano

Common name: roughened rock tripe

FIELD SUMMARY — A brownish-black umbilicate, foliose lichen with stipitate, smooth apothecia and a green photobiont. Saxicolous.

Diagnostic characters — *Umbilicaria rigida* can be distinguished by its (1) flat, smooth, stipitate apothecia lacking fissures or ridges, (2) warty lower surface lacking rhizines, (3) lack of soredia or isidia, and (4) centrally pruinose and ridged upper surface.

Description

THALLUS — foliose, umbilicate, mostly 2–5 (15) cm broad, margin becoming lacerate, perforate, or areolate-cracked; upper surface dark brown to black, ridged, pruinose around the umbo and on tops of central ridges; lower surface light brown to black, warty. —soredia and isidia absent. —rhizines and cilia absent. —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — common, stipitate, lecideine, flat, smooth, without ridges. —asci 8-spored. —spores 11–14 × 3–5 μm.

CHEMISTRY — Spot tests negative.

Ecology — *Umbilicaria rigida* is known from rock in montane to arctic-alpine habitats.

Distribution — *Umbilicaria rigida* is known from Eurasia, Greenland, and North America. In western North America, *U. rigida* is known from Alaska, British Columbia, Washington, Oregon, and California. In Oregon, *U. rigida* is reported from Jackson, Lake, and Marion counties within the East and West Cascades ecoregions.

Similar species — *Umbilicaria lyngei*, *U. rigida* and *U. scholanderi* all have smooth apothecial disks. *Umbilicaria scholanderi* thalli are less than 2 cm broad, often smooth (not ridged) over the thallus center, and have rhizines on the lower surface. *Umbilicaria lyngei* also has a smooth upper surface, is black sooty below, and rarely has apothecia.

References — McCune and Geiser (2009, p. 338).

References with color photos — Brodo et al. (2001, p. 707).

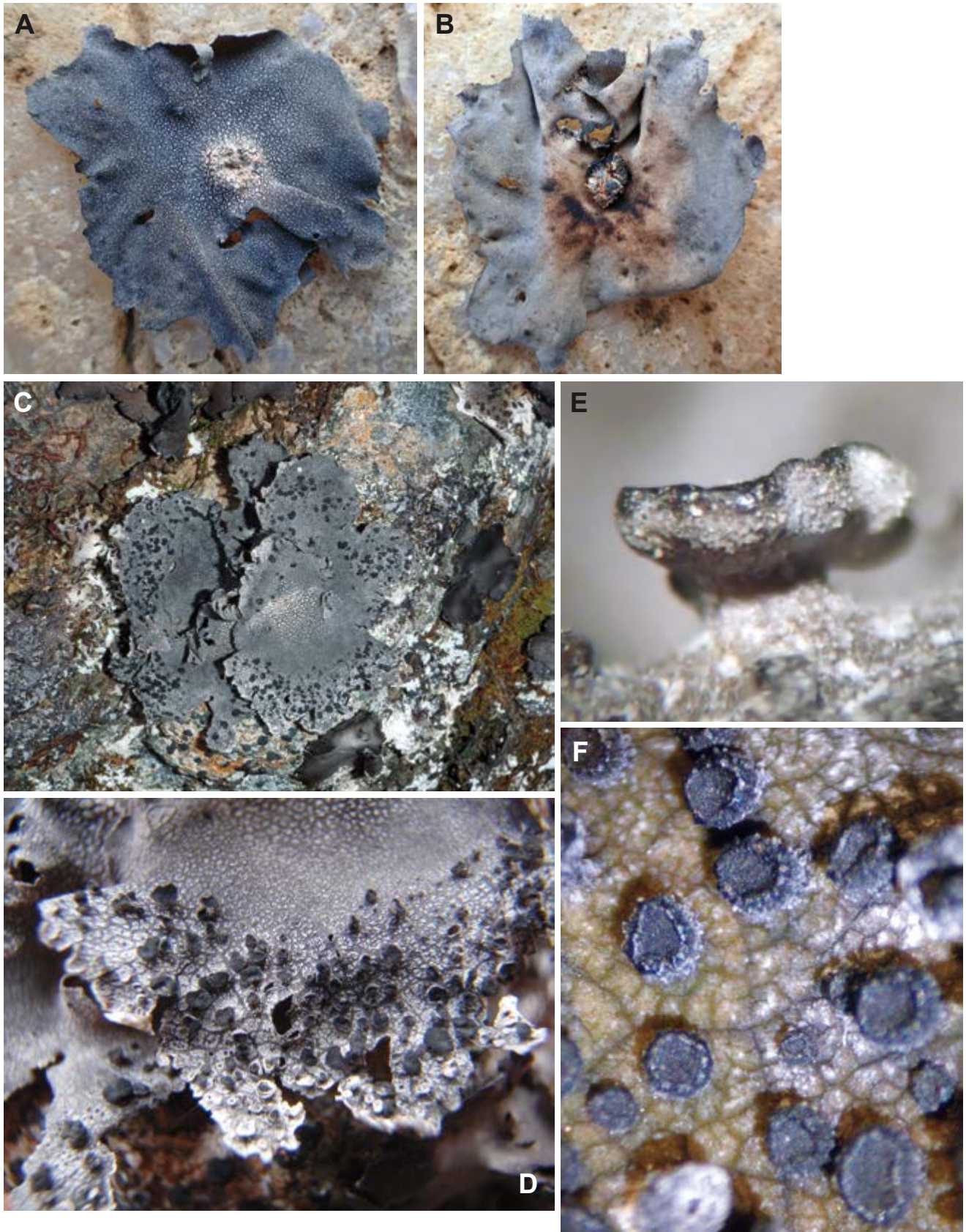


Plate 53. *Umbilicaria rigida*. A. Thallus upper surface. B. Thallus lower surface. C. Thalli upper surfaces. D. Apothecia. E. Stipitate apothecium. F. Apothecia with smooth disks. (A–F: Loring Pers. Coll.)

Usnea ceratina Acharius

Recent synonym: *Usnea californica* Herre

Common name: warty beard lichen

FIELD SUMMARY — A pale greenish or yellowish tinged, pendulous fruticose lichen with a reddish or pink central cord, and a green photobiont. Epiphytic, rarely saxicolous.

Diagnostic characters — *Usnea ceratina* can be distinguished by its (1) pinkish central cord and medulla, (2) raised tubercles with soredia and isidia, (3) papillae, and (4) maritime habitat.

Description

THALLUS — fruticose, pendulous, branches 6–20 (100) cm long and 1.5–2.0 mm wide with sparse to abundant fibrils and papillae; base pale or blackened; cortex (6) 9–13 percent, glossy, yellow-green with abundant raised tubercles becoming isidiate and/or coarsely sorediate; annular cracks usually abundant; medulla white or pinkish to almost red, dense, 20–30 percent; central cord reddish to pinkish brown, 23–33 (38) percent. McCune and Geiser (2009) cortex/medulla/axis ratio: 9/22/38. —soredia coarse, arising from tubercles. —isidia arising from tubercles. —pycnidia absent. —photobiont green (trebouxioid).

APOTHECIA — unknown.

CHEMISTRY — medulla and axis often C+ yellow, CK+ deep yellow-orange; medulla K-, KC-, P-.

Ecology — *Usnea ceratina* is known from conifers and occasionally rock (sandstone) in maritime habitats.

Distribution — *Usnea ceratina* is known from Eurasia, North and South America, and Australia. In western North America, *U. ceratina* is known from British Columbia, Oregon, California, and Mexico. In Oregon, *U. ceratina* is reported from Curry County within the Coast Range ecoregion.

Similar species — The only other species of *Usnea* with a colored central axis in Oregon are *U. flavocardia* and *U. trichodea*. *Usnea flavocardia* has a yellow central axis and *U. trichodea* has a brown central axis and lacks tubercles, soredia, and isidia.

References — Clerc (2007, p. 312), Herrera-Campos et al. (1998), Clerc and Herrera-Campos (1997), Halonen et al. (1998).

References with color photos — Sharnoff (2014, p. 204), McCune and Geiser (2009, p. 359), Brodo et al. (2001, p. 715).

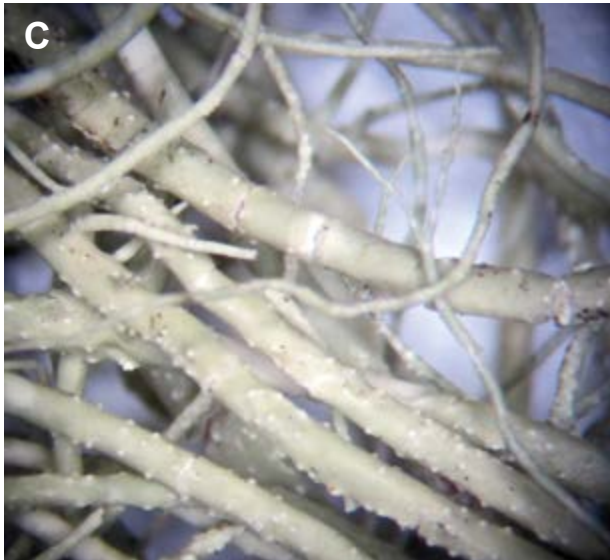


Plate 54. *Usnea ceratina*. A. Thallus. B. Red central cord and cottony medulla. C. Papillae. D. Red central cord.
(A–D: Loring Pers. Coll.)

Usnea lambii (Imshaug) Wirtz and Lumbsch

Recent synonym:

Usnea sphacelata R. Brown (misapplied in the Pacific Northwest)

Neuropogon lambii Imshaug

Common name: zebra beard lichen, banded beard lichen

FIELD SUMMARY — A pale greenish or yellowish tinged, tufted fruticose lichen with blackened areas, a central cord and a green photobiont. Saxicolous.

Diagnostic characters — *Usnea lambii* can be distinguished by its (1) apically blackening cortex, (2) tufted habit, and (3) alpine or subalpine, saxicolous habitat.

Description

THALLUS — fruticose, tufted, to 3 (5) cm, branches terete; base blackened or orange-brown; cortex variable in thickness, yellow-green, variegated with black bands becoming continuous distally; medulla white, loose; central cord very thin, 2–5 percent of the branch diameter. —soredia granular, yellow, sometimes blackening, in rounded soralia, mostly near branch apices. —isidia absent but isidioid structures may develop with soredia. —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — rare, yellow to black.

CHEMISTRY — medulla K-, P- or P+ deep yellow.

Ecology — *Usnea lambii* is known from noncalcareous rock at high elevations. In Oregon, it is known from volcanic peaks of the Cascade Mountains in alpine and subalpine habitats.

Distribution — *Usnea lambii* is known from Iceland, North and South America, New Zealand, and Antarctica. In western North America, *U. lambii* is known from Washington, Oregon, and Mexico. In Oregon, *U. lambii* is reported from Deschutes, Douglas, Hood River, and Klamath counties within the West Cascades ecoregion.

Similar species — *Usnea lambii* is distinguished from other *Usnea* species by its apically blackening, tufted thallus and saxicolous habitat.

References — Sadowsky and Ott (2012), Wirtz et al. (2008), Imshaug (1954).

References with color photos — McCune and Geiser (2009, p. 369).



Plate 55. *Usnea lambii*. A–B. Thallus. C. Branch apices with soralia. (A–C: Loring Pers. Coll.)

Usnea nidulans Motyka

Recent synonym: none

Common name: nested beard lichen

FIELD SUMMARY — A pale greenish or yellowish tinged, tufted or rarely subpendant fruticose lichen with a central cord and a green photobiont. Epiphytic.

Diagnostic characters — *Usnea nidulans* can be distinguished by its (1) tufted habit, (2) terete branches, (3) presence of isidia and/or soredia, (4) fascicles of fibrils, (5) low, inconspicuous papillae, and (6) maritime habitat.

Description

THALLUS — fruticose, tufted or rarely subpendant, branches cylindrical with anisotomic dichotomous branching pattern and annular cracks, axils about 90 degrees, fibrils in bundles of 2–4, often arising from tuberculate soralia; base pale or blackened; cortex pale yellow-green, 6–12 percent, glossy and translucent, weakly papillose and foveolate. —soredia may be present in tuberculate soralia. —isidia occurring on early developing tuberculate soralia, often clustered. —pycnidia absent. —photobiont green (trebouxoid).

APOTHECIA — unknown.

CHEMISTRY — two chemotypes: (1) medulla K+ yellow to red/orange, P+ orange and (2) K-, P+ deep yellow.

Ecology — *Usnea nidulans* is known from conifers and hardwoods in maritime habitats.

Distribution — *Usnea nidulans* is known from North and South America. In western North America, *U. nidulans* is known from British Columbia, Washington, and Oregon. In Oregon, *U. nidulans* is reported from Tillamook County within the Coast Range ecoregion.

Similar species — *Usnea hirta* is similar, but has main branches weakly to strongly foveolate, lacks papillae, and never has a blackened base.

References — McCune and Geiser (2009, p. 364), Halonen, et al. (1998), Goward (1999).



Plate 56. *Usnea nidulans*. A. Thallus. B. Thallus branches. C. Fascicles of fibrils. (A–C: Loring Pers. Coll.)

Usnea rubicunda Stirton

Recent synonym:

Usnea protensa Stirton

Usnea rubescens Stirton

Usnea rubrotincta Stirton

Usnea sublurida Stirton

Common name: red beard lichen

FIELD SUMMARY — A reddish-brown, tufted to pendulous fruticose lichen with a white central cord and a green photobiont. Epiphytic, rarely saxicolous.

Diagnostic characters — *Usnea rubicunda* can be distinguished by its (1) red-pigmented outer cortex, (2) white central cord, (3) pale base, and (4) abundant, granular, punctiform soredia in tuberculate soralia.

Description

THALLUS — fruticose, tufted to pendant, with tapering branches to 15 cm but usually less than 8 cm; base pale; cortex red-tinged to reddish-brown but often greenish distally or with irregular red pigmentation, thick, 10–18 percent, papillose, fibrillose; medulla white, dense and thin, 10–22 percent; central cord white, thick, 35–44 (60) percent. McCune and Geiser (2009) cortex/medulla/axis ratio: 14/12/48. —soredia usually present on tuberculate soralia, granular, punctiform. —isidia frequent, conspicuous. —pycnidia absent. —photobiont green (trebouxioid).

APOTHECIA — unknown.

CHEMISTRY — medulla K+ yellow to red, KC-, C-, P+ yellow to red.

Ecology — *Usnea rubicunda* is known from bark and wood of trees and shrubs, rarely on rock. It occurs in open coastal forests and shrub communities from sea level to 3,000 feet in elevation.

Distribution — *Usnea rubicunda* is known from Eurasia, Africa, North and South America, Australia, New Zealand and Hawaii. In western North America, *U. rubicunda* is known from British Columbia, Washington, Oregon, California and Mexico. In Oregon, *U. rubicunda* is reported from Benton, Clackamas, Coos, Curry, Lane, Lincoln, and Tillamook counties within the Coast Range and West Cascades ecoregions.

Similar species — The red cortex of *Usnea rubicunda* is unique in the Pacific Northwest. *Usnea subcornuta* is a red-pigmented species that occurs infrequently in California but is only pigmented on the inner cortex and medulla.

References — Clerc (2007, p. 328), Halonen et al. (1998), Clerc and Herrera-Campos (1997), Hale and Cole (1988, p. 174), James (1979).

References with color photos — Sharnoff (2014, p. 9, 212), McCune and Geiser (2009, p. 363, 372), Brodo et al. (2001, p. 723), Hale and Cole (1988, plate 11).



Plate 57. *Usnea rubicunda*. A–C. Thallus. (A–C: Loring Pers. Coll.)

Usnea subgracilis Vainio

Recent synonyms:

Usnea schadenbergiana Göppert and Stein

Usnea hesperina Motyka

Common name: silken beard lichen

FIELD SUMMARY — A pale greenish or yellowish tinged, pendulous, fruticose lichen with numerous annular cracks, a central cord and a green photobiont. Epiphytic, rarely saxicolous.

Diagnostic characters — *Usnea subgracilis* can be distinguished by its (1) branched, pendulous habit, (2) smooth, cylindrical branches lacking papillae, (3) abundant annular cracks, (4) pale base, and (5) generally few to no fibrils.

Description

THALLUS — fruticose, pendulous, to 50 cm or longer, main branches with few fibrils, dichotomously branched mostly basally; branches smooth, cylindrical, axils about 90 degrees with abundant annular cracks at the base; base pale; cortex pale greenish-gray, matte, soft and thick, 8–14 (20) percent, lacking papillae; medulla white, dense and thin, 6–16 percent; central cord thick, 43–64 percent. McCune and Geiser (2009) cortex/medulla/axis ratio: 15/17/38. —soredia present in minute, tuberculate soralia. —isidia sparse to absent, soon abraded. —pycnidia absent. —photobiont green (trebouxioid).

APOTHECIA — rare, subterminal, known only from collections from Mexico.

CHEMISTRY — medulla K-, KC+ pink, C-, P+ red.

Ecology — *Usnea subgracilis* is known from conifer bark and wood, occasionally hardwoods, in maritime habitats. It is rarely found on rock.

Distribution — *Usnea subgracilis* is known from Eurasia, Africa, and North America. In western North America, *U. subgracilis* is known from Alaska, Oregon, California, and Mexico. In Oregon, *U. subgracilis* is reported from Benton, Clatsop, Coos, Curry, Douglas, Jackson, Lane, Linn, and Tillamook counties within the Coast Range, Willamette Valley, Klamath Mountains, and West Cascades ecoregions.

Similar species — *Usnea chaetophora* has a slightly to distinctly blackened base and usually has papillae, although they may be low, sparse, or lacking. Additionally, *U. chaetophora* has a thicker medulla than cortex. *Usnea filipendula* and *U. scabrata*, two common pendulous species, differ by having conspicuous papillae (especially on older branches), few annular cracks, and generally abundant fibrils.

References — Clerc (2007, p. 329), Clerc (2004), Halonen et al. (1998), Clerc and Herrera-Campos (1997).

References with color photos — McCune and Geiser (2009, p. 374), Brodo et al. (2001, p. 720).

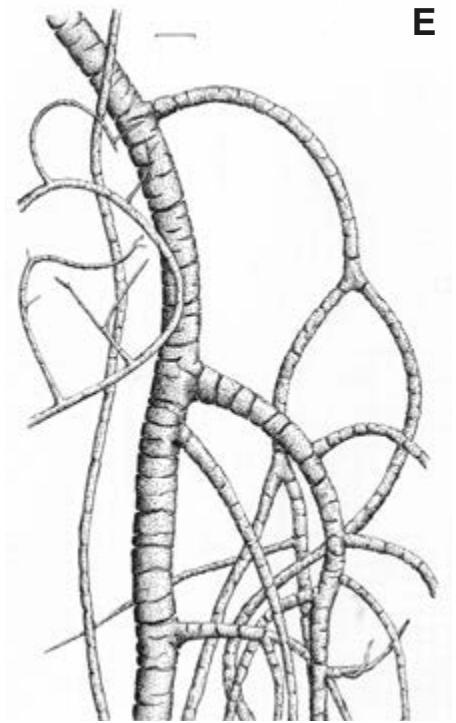
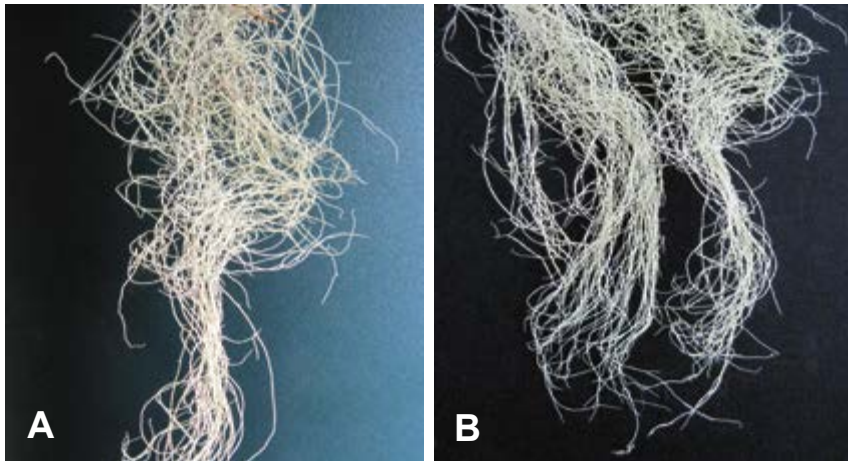
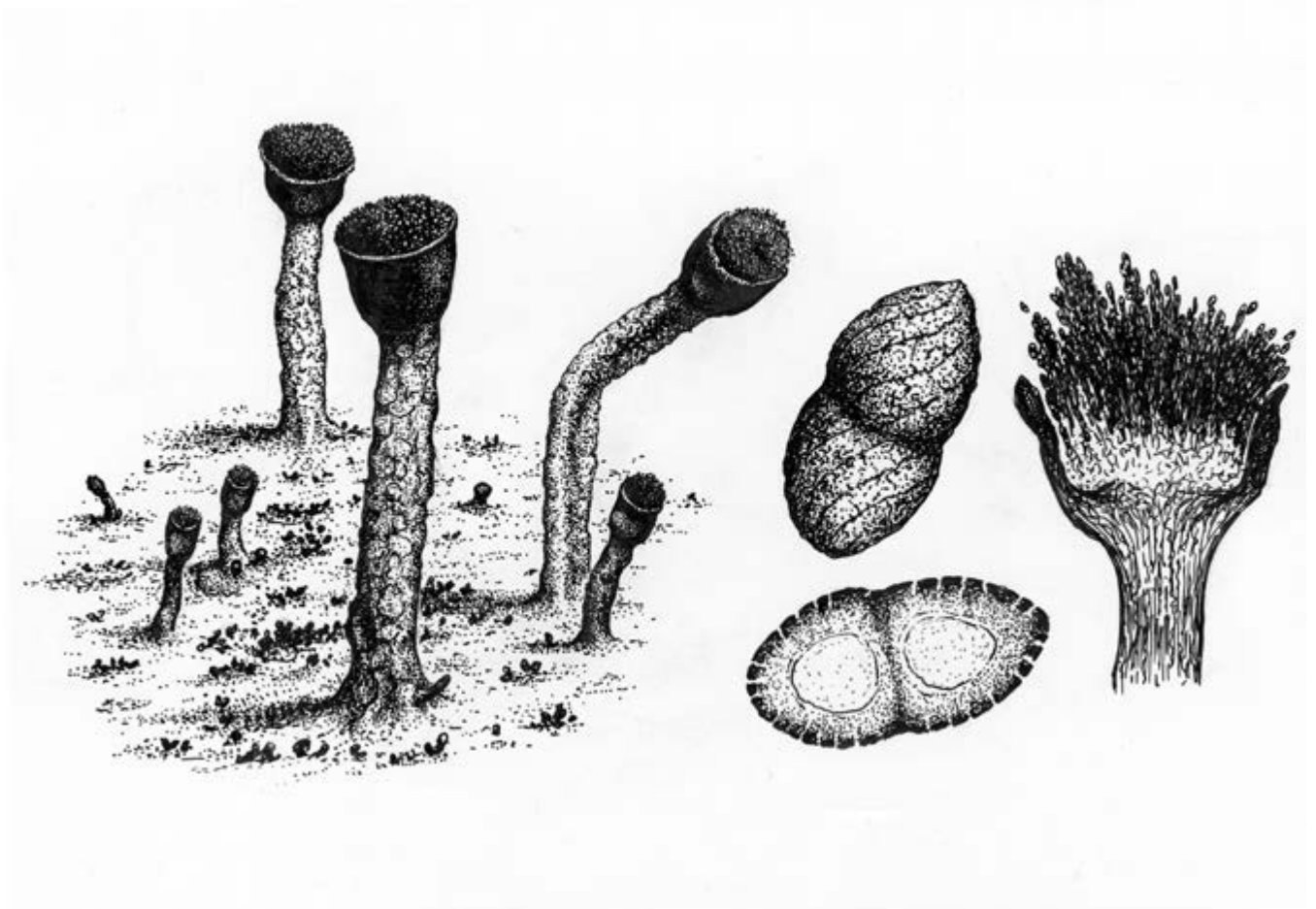


Plate 58. *Usnea subgracilis*. A–B. Thallus. C–D. Annular cracks. E. Mikulin drawing. (A–D: Loring Pers. Coll.)

Microlichens



Alexander Mikulin

Buellia oidalea (Tuckerman) Tuckerman

Recent synonyms: none

Common names: button lichen, disk lichen

FIELD SUMMARY — A yellowish to grayish-green crustose lichen with small black apothecia with undifferentiated margins. Epiphytic.

Diagnostic characters — *Buellia oidalea* can be distinguished by its (1) yellow to grayish-green, crustose thallus, (2) epiphytic habitat on bark and lignin of various species, (3) hypermaritime habitat, (4) small, black, emarginate apothecia, and (5) large, muriform spores that have swollen, unpigmented walls at each end when developing.

Description

THALLUS — crustose, yellowish-white to glaucous gray, smooth, thin and rimose-areolate to thick and rugose-verrucose or even subsquamulose; prothallus often present, black; medulla white. —soredia and isidia absent. —pycnidia when present immersed, with uppermost portion protruding, wall mainly pigmented in upper portion. —photobiont green (*Trebouxia* or chlorococcoid).

APOTHECIA — sessile, lecideine, 0.2–2.0 mm, black, epruinose, flat maturing to convex. —asci clavate, usually 8-spored. —spores smooth, hyaline to more or less olive, apices bulging when immature, maturing brown with apices remaining hyaline, muriform with 6–10 transverse septa and 2–5 longitudinal septa, 13–40 cells in section, ellipsoid to oblong, (30) 33.7–45.5 (57) × (12) 13.3–17.7 (27) μm.

CHEMISTRY — thallus K- or K+ dirty yellow, C+ orange, P-; medulla K-, C-, P-, I-, UV+ pale to bright yellow to orange; hymenium I+ deep blue.

Ecology — *Buellia oidalea* is found on bark and wood of both hardwood and coniferous trees and shrubs in open habitats in coastal fog zones along the Pacific coast. Habitats include dune areas, salt marshes, chaparral, and coastal desert areas from sea level to 700 feet in elevation. It has been recorded on a variety of substrates including: red alder, Monterey cypress, Sitka spruce, shore pine, Douglas-fir, willow, redwood posts, and shrubs.

Distribution — *Buellia oidalea* is endemic to western North America and known from British Columbia, Washington, Oregon, California, and Mexico. In Oregon, *B. oidalea* is reported from Curry County within the Coast Range ecoregion.

Similar species — *Buellia muriformis*, common throughout most of western Oregon, has smaller spores (21) 25–32 (40) × (11) 13–16 (18) μm, with walls of uniform thickness and is K+ yellow, P+ yellow and C-. *Rhizocarpon penichrum* (= *Buellia oidalea* var. *penichra*) is also common, but has smaller, submuriform spores, (17) 21–34 (41) × (10) 11–17 (21) μm, and is known from the Coastal and Cascade Mountain ranges.

References — Bungartz et al. (2007, p. 156), McCune (2012a, p. 45), Leshner et al. (2003, p. 33), Imshaug (1951).

References with color photos — Sharnoff (2014, p. 233), Nash III et al. (2007, color plates).

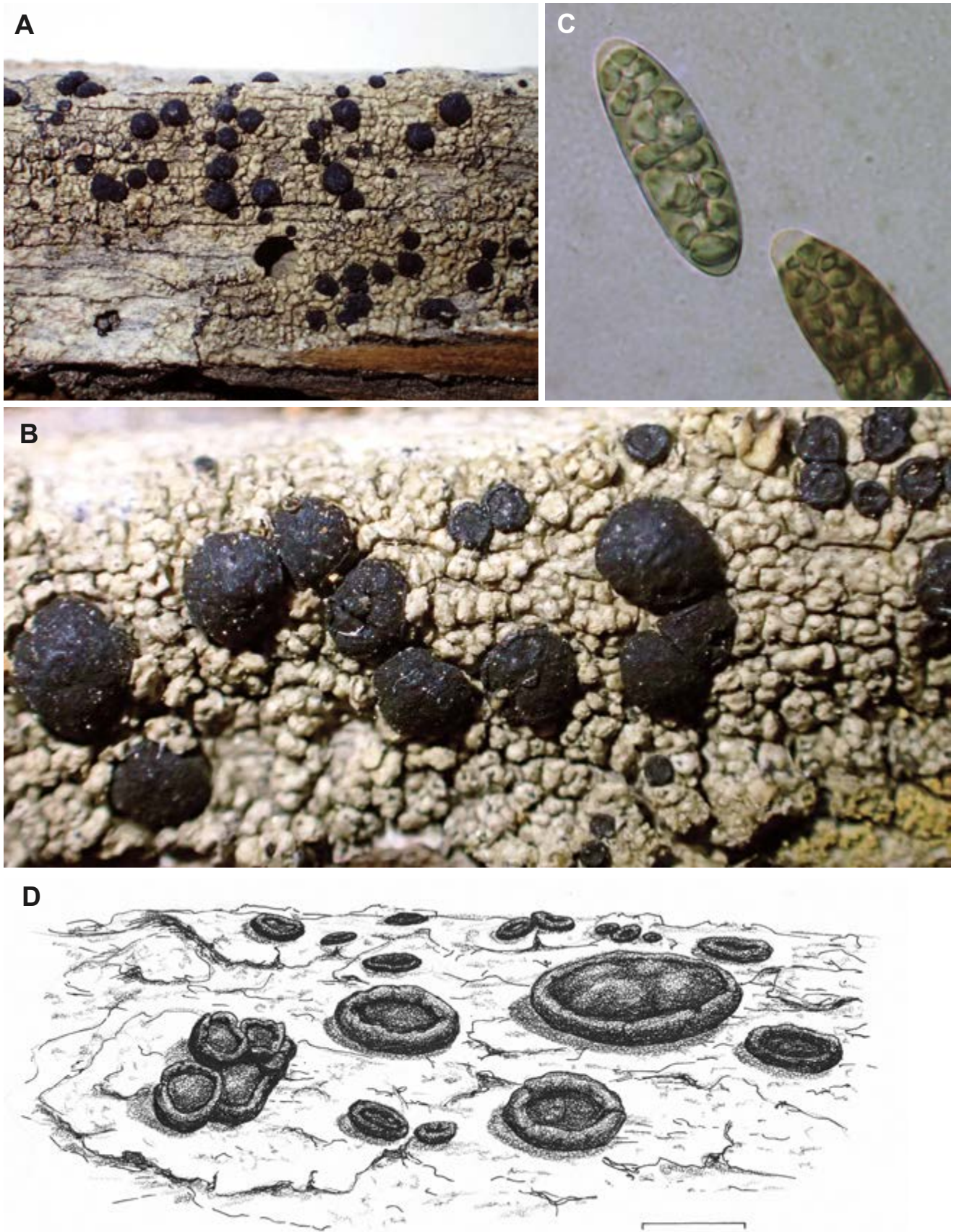


Plate 59. *Buellia oidalea*. A. Crustose thallus with apothecia. B. Apothecia. C. Muriform spores with unpigmented apices. D. Mikulin drawing. (A–C: McCune #29631)

Calicium abietinum Persoon

Recent synonym: none

Common name: black stubble, spike lichen

FIELD SUMMARY — A stalked, black pin lichen often with a brownish tinged stalk and a black spore mass, lacking pruina. Epiphytic.

Diagnostic characters — *Calicium abietinum* can be distinguished by its (1) immersed thallus, (2) black ascomata, often with a brownish hue but lacking pruina, (3) black spore mass with an epruinose excipulum, (4) negative spot tests, and (5) large, verruculose, 1-septate spores.

Description

THALLUS — immersed. —photobiont green (*Trebouxia*).

ASCOMATA — entirely black, or stalk with a brownish tinge, 0.4–0.6 mm tall. —stalk 0.08–0.2 mm diameter. —capitulum lenticular to somewhat bell shaped, 0.2–0.3 mm diameter. —excipulum formed as a continuation of the stalk. —pruina absent. —mazaedium well-developed, black. —asci cylindrical, 38–44 × 4–5 µm, uniseriately-arranged. —spores 13–15 × 5–7 µm, ellipsoid, ornamented with minute warts and often irregular cracks, dark blue under magnification (~40x).

CHEMISTRY — spot tests negative.

Ecology — *Calicium abietinum* is known from coniferous and deciduous wood from low elevations up to 4,000 feet in boreal to moderate, cool temperate areas. It has also been recorded on western red cedar bark, wooden fence posts, on manzanita at the edge of a coastal meadow, and on a ridge in a Sitka spruce and western hemlock forest.

Distribution — *Calicium abietinum* is known from Eurasia, Africa, North and South America, and Australia. In western North America, *C. abietinum* is known from Washington, Oregon, California, Alberta, Idaho, and Mexico. In Oregon, *C. abietinum* is reported from Benton, Clackamas, Coos, Deschutes, Douglas, Jefferson, Josephine, Lane, Lincoln, Polk, Tillamook, and Wasco counties within the Coast Range, Klamath Mountains, and West Cascades ecoregions.

Similar species — In general, *Calicium* can be distinguished from other pin lichen by the presence of a distinct stalk that is narrower than the capitulum, a true mazaedium with a black spore mass, 1-septate spores usually with distinct ornamentation at maturity, and *Trebouxia* (chlorococcoid algae) as a photobiont. *Calicium adpersum* has yellow pruina over the spore mass and excipulum, spirally striate spores and a K+ red thallus. *Calicium glaucellum* has smaller spores, 9–13 × 3.5–4.5 µm, and often has a faint white pruina along the edge of the excipulum but can be epruinose. *Calicium lenticulare* has a superficial thallus (though often very thin), an I+ dark blue to blackish ascomata in section or squash mounts, and occasionally has white pruina.

References — Tibell and Ryan (2004, p. 40), Goward (1999, p. 72), Tibell (1999, p. 22), Tibell (1996, p. 16).

References with color photos — Nordic Lichen Flora (1999, p. 82).

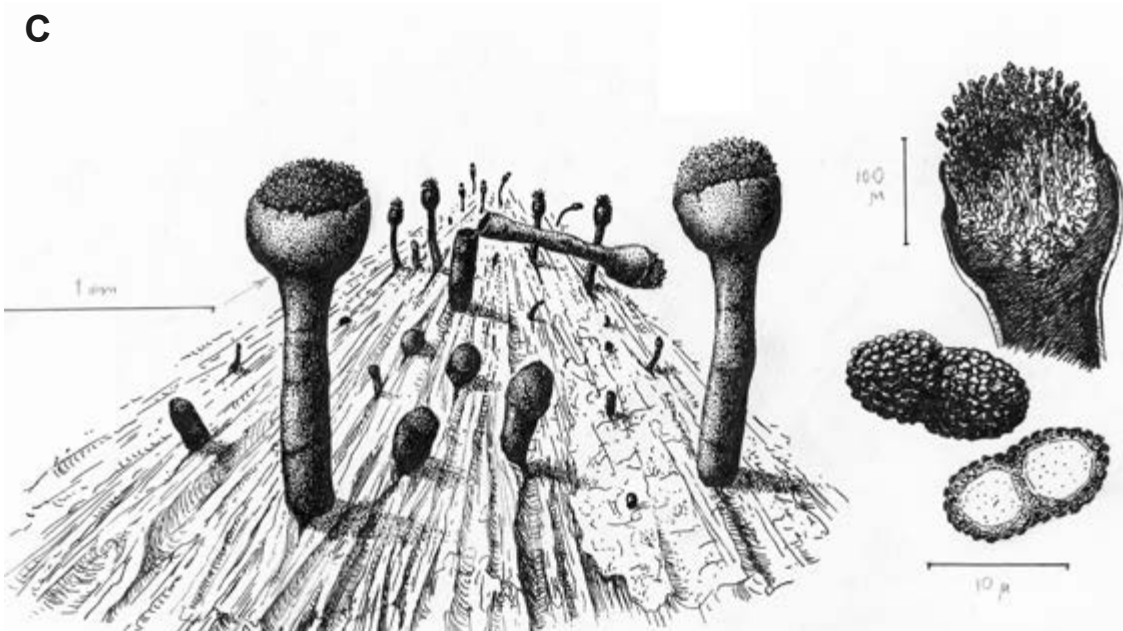


Plate 60. *Calicium abietinum*. A. Ascomata. B. Verruculose spores. C. Mikulin drawing. (A–B: McCune #23277)

Calicium adpersum Persoon

Recent synonyms: none

Common name: paleface stubble, spiral-spored gilded-head pin lichen

FIELD SUMMARY — A stalked, black pin lichen with yellow pruina and black spore mass. Epiphytic.

Diagnostic characters — *Calicium adpersum* can be distinguished by its (1) brown to black ascomata, (2) black mazaedium, (3) yellow pruina, (4) spiral spore ornamentation, (5) K+ red thallus, and (6) positive iodine reaction on the outermost layer of the stalk.

Description

THALLUS — immersed or superficial, gray, irregular to verrucose. —photobiont green (*Trebouxia*).

ASCOMATA — 0.8–1.4 mm tall. —stalk 0.2–0.3 mm diameter, short to moderately long, outermost layer translucent, gelatinous. —capitulum broadly lenticular, 0.6–0.8 mm diameter. —excipulum dark brown. —pruina yellow on the surface of the mazaedium and excipulum. —mazaedium well-developed, black. —asci clavate, with 2- to 3-seriately arranged spores, 24–33 × 6–8 µm. —spores with spiral ornamentation, 1-septate, dark brown, 13–17 × 6–8 µm.

CHEMISTRY — thallus K+ red, PD+ yellow to orange, outermost thin layer of stalk I+ blue.

Ecology — *Calicium adpersum* is known from trunks of oaks in semi-shaded habitats and conifer bark, especially western red cedar in open to sheltered marine influenced forests at low elevations. In Finland, *C. adpersum* is known from spruce bark and conifer lignin.

Distribution — *Calicium adpersum* is known from Europe, North and South America. In western North America, *C. adpersum* is known from British Columbia, Washington, Oregon, California, and Mexico. In Oregon, *C. adpersum* is reported from Benton and Polk counties within the Coast Range and Willamette Valley ecoregions.

Similar species — In the Pacific Northwest, both *Calicium trabinellum* and *C. chlorosporum* have yellow pruina. *Calicium trabinellum* has smaller spores, (10–11 × 5–6 µm), ornamented with cracks and short ridges and the thallus is K- and P-. *Calicium chlorosporum* has a pale yellowish-green thallus vs. gray in *C. adpersum*. Additionally, most other species of *Calicium* do not have a K+ red thallus. See *Calicium abietinum* for additional discussion on similar species.

References — Peterson (2012), Goward (1999, p. 73), Tibell (1999, p. 23).

References with color photos — Nordic Lichen Flora, (1999, p. 82).

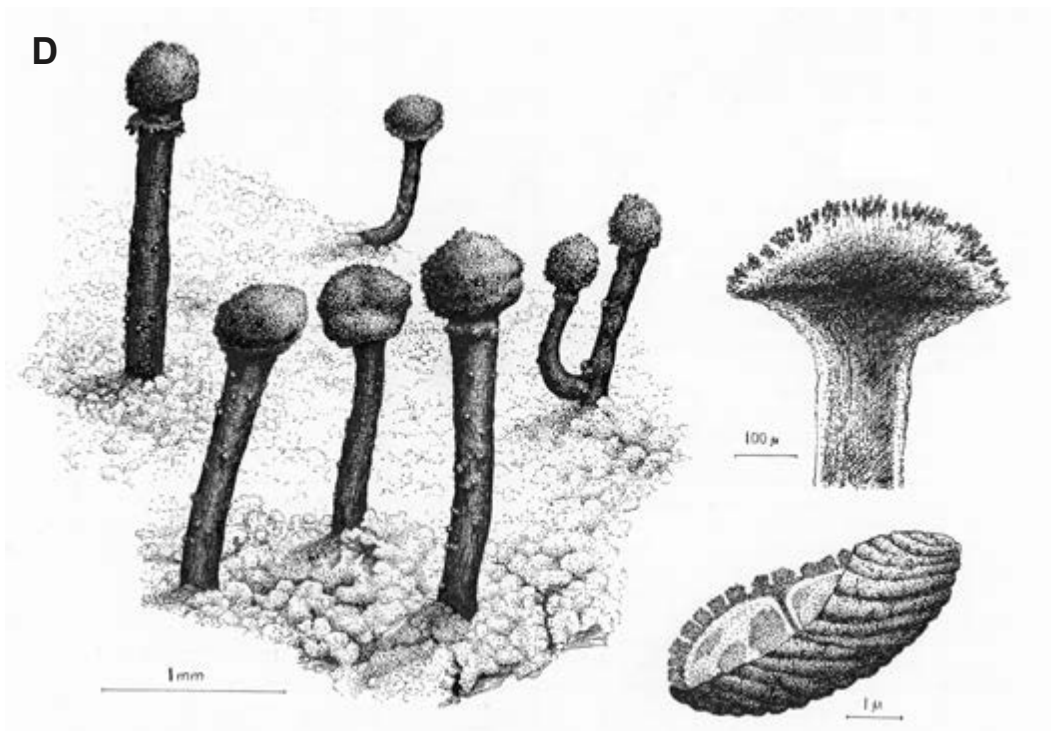
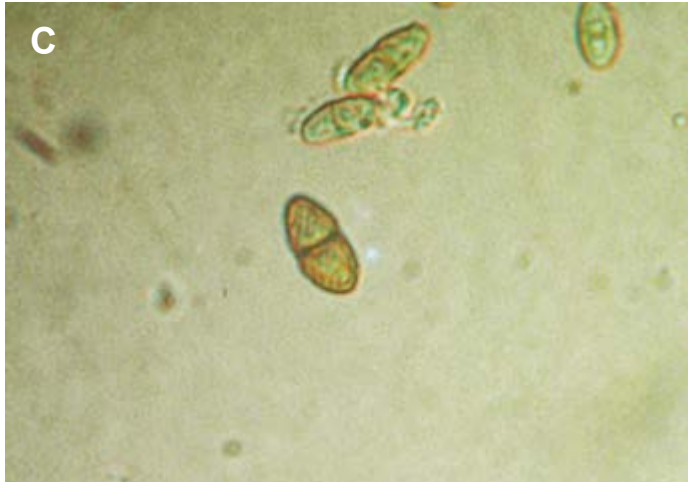
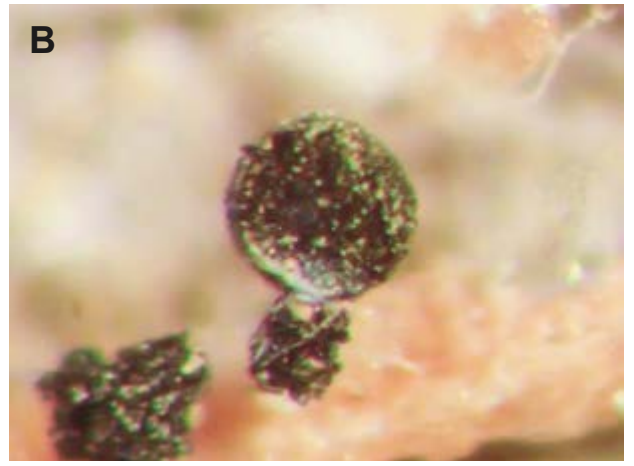


Plate 61. *Calicium adpersum*. A. Ascomata. B. Yellow pruina. C. Spores with spiral ornamentation. D. Mikulin drawing. (A–C: McCune #23049)

Calicium quercinum Persoon

Recent synonyms: none

Common name: spike lichen

FIELD SUMMARY — A stalked, black pin lichen with white pruina and a black spore mass. Epiphytic.

Diagnostic characters — *Calicium quercinum* can be distinguished by its (1) thick, gray, granular, K+ thallus, (2) black ascomata and spore mass, (3) white pruina, (4) spores with distinct, irregular cracks and faint spiral ornamentation, and (5) growth on hardwoods.

Description

THALLUS — superficial, gray, dull, minutely granular, generally well-developed. —photobiont green (*Trebouxia*).

ASCOMATA — black, stout, 0.8–1.3 mm tall. —stalk 0.1–0.2 mm diameter, brown in cross-section. —capitulum lenticular, 0.4–0.6 mm diameter. —excipulum dark brown. —pruina white, located on the lower side of the capitulum. —mazaedium black, well-developed. —asci cylindrical, 24–39 × 4–5 µm with uniseriate to biseriate spore arrangement. —spores 10–13 × 5.5–6.0 µm with spiral ornamentation and irregular cracks.

CHEMISTRY — thallus K+ yellow-red, C-, P+ yellow, all parts I-.

Ecology — *Calicium quercinum* is known from bark and rarely lignin of oak, maple, ash, and elm in partially shaded habitats in hardwood forests.

Distribution — *Calicium quercinum* is known from Eurasia and North America. In western North America, *C. quercinum* is known from Washington and Oregon. In Oregon, *C. quercinum* is reported from Benton County within the Willamette Valley ecoregion.

Similar species — *Calicium glaucellum* has an immersed thallus that is K-. *Calicium adaequatum* and *C. lenticulare* have a positive reaction to iodine in the stalk tissues. The thallus of *C. parvum* is K+ dirty yellow, asci are clavate, and spores are irregularly roughened, lacking spiral ornamentation. See *Calicium abietinum* for additional discussion on similar species.

References — Selva (2014), Tibell (1999, p. 27).

References with color photos — Nordic Lichen Flora (1999, p. 83).



Plate 62. *Calicium quercinum*. A–B. Ascomata. (A–B: Stone Pers. Coll.)

Chaenotheca balsamconensis J.L. Allen and McMullin

Recent synonyms: none

Common name: balsam cone chaenotheca

FIELD SUMMARY — A stalked, black, epruinose pin lichen with a dark brown spore mass growing on the bracket fungus, *Trichaptum abietinum*. Fungicolous.

Diagnostic characters — *Chaenotheca balsamconensis* can be distinguished by its (1) occurrence on *Trichaptum abietinum*, (2) immersed thallus, (3) smooth spores, (4) K+ red reaction in stalk tissues, and (5) *Trebouxia* photobiont.

Description

THALLUS — immersed (rarely superficial), corticate, granular, distinguishable in squash mounts, sometimes with red pigments that are K+ red. —photobiont green (*Trebouxia*).

ASCOMATA — tall, thin and black, (0.4) 0.8–1.4 (2.3) mm tall. —stalk (0.06) 0.07–0.11 (0.15) mm diameter. —capitulum obconic to obovate, 0.2–0.4 (0.6) mm diameter —excipulum well developed. —pruina absent. —mazaedium dark brown to black. —asci cylindrical to narrowly clavate, (16.2) 17.9–27.6 (36.9) × (2.4) 2.6–4.1 (5.0) μm, spores uniseriately arranged. —spores spherical, brown, smooth, (3.0) 3.4–5.7 (8.6) μm

CHEMISTRY — thallus K-, C-, P-, UV+ orange; mazaedium K+ yellow-orange, C+ bleeding faint yellow, P-; stalk tissues K+ red in some specimens, C-, P+ faint yellow. Some specimens have K+ red reactions on pigments embedded in the substrate.

Ecology — *Chaenotheca balsamconensis* is only known from *Trichaptum abietinum* in mixed conifer and hardwood forests. It was described from spruce and fir forests with birch, rhododendron, and mountain ash at 6,491 feet in elevation. In western North America, *Trichaptum abietinum* mostly occurs on Douglas-fir, true fir, and pines.

Distribution — *Chaenotheca balsamconensis* is known from North America. In western North America, *C. balsamconensis* is known from British Columbia, Washington, and Oregon. In Oregon, *C. balsamconensis* is reported from Linn County within the West Cascades ecoregion.

Similar species — In general *Chaenotheca* can be distinguished from other pin lichen genera by the presence of a distinct stalk that is narrower than the capitulum and a true mazaedium with a distinct brown spore mass. *Chaenotheca balsamconensis* is the only known ‘pin lichen’ species growing on *Trichaptum abietinum*. In addition, stalk tissues of some specimens of *C. balsamconensis* exhibit a distinctive K + red reaction.

References — Hardman and Stone (2015).

References with color photos — Allen and McMullin (2015).

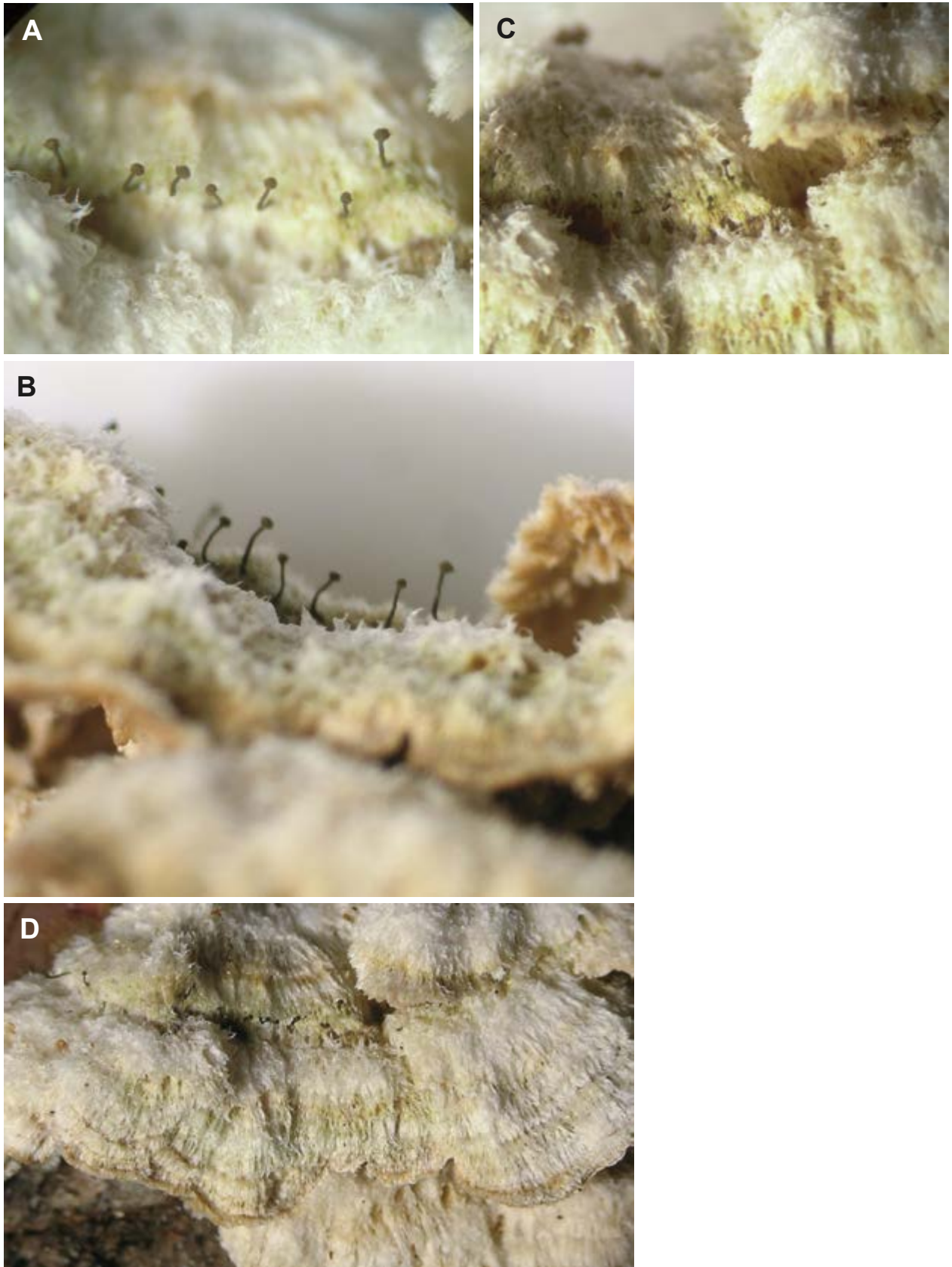


Plate 63. *Chaenotheca balsamconensis*. A.–D. Ascomata on *Trichaptum abietinum*. (A–D: Hardman Pers. Coll.)

Chaenothecopsis rubescens Vainio

Recent synonyms: none

Common name: blushing chaenothecopsis

FIELD SUMMARY — A non-lichenized, stalked brown pin, lacking pruina, with a non-mazaediate ascoma and brownish spore mass usually occurring on hardwood bark, twigs and branches. Lichenicolous, algicolous.

Diagnostic characteristics — *Chaenothecopsis rubescens* can be distinguished by its (1) simple, minutely-ornamented spores, (2) persistent K+ intense red reaction with yellowish pigments in the ascomata, (3) non-mazaediate ascomata, and (4) parasitic or parasymbiotic association with free-living and lichenized *Trentepohlia*.

Description

THALLUS — Immersed or superficial, grayish-green. —photobiont absent.

ASCOMATA — 0.4–0.7 (0.8) mm tall. —stalk shiny, medium brown to dark yellowish-brown, 0.04–0.07 mm diameter; interior of stipe with pale hyphae containing yellow to reddish pigments. —capitulum lenticular, black, 0.1–0.3 mm diameter. —excipulum dark yellowish-brown. —pruina usually absent. —mazaedium absent or not developed. —asci unevenly thickened, with a thin apical canal, 31–37 × 3.0–3.5 μm. —spores medium brown, non-septate, allantoid to ellipsoidal with distinctive minute areolate ornamentation, (5) 7–9 × (2.5) 3.0–3.5 μm.

CHEMISTRY — persistent K+ red on all brown and yellowish to red pigments in the ascomata, C-.

Ecology — In northern Europe, *Chaenothecopsis rubescens* is known only from the bark of alder. In Asia it is recorded from other deciduous trees, rarely conifers. In Switzerland, it develops on the crustose lichen *Arthonia byssacea* over oak, less often on ash. In Oregon it is known from the base of Oregon white oak.

Distribution — *Chaenothecopsis rubescens* is known from Eurasia and North America. In western North America, *C. rubescens* is known from Oregon. In Oregon, *C. rubescens* is reported from Benton and Wasco counties within the Willamette Valley and West Cascades ecoregions.

Similar species — In *Chaenothecopsis*, the apex of the ascus is thickened but has a central canal, differentiating it from the similar genus *Mycocalicium*, which lacks a central canal. *Chaenothecopsis pusiola* has smaller, 1-septate, smooth spores (5.4–6.5 × 2.2–2.7 μm).

References — Peterson (2012), Groner (2006), Motiejūnaitė and Prigodina-Lukošienė (2002), Tibell (1999, p. 46), Peterson and Rikkinen (1999), Titov and Tibell (1993), Selva (1988).

References with color photos — Nordic Lichen Flora (1999, p. 87).

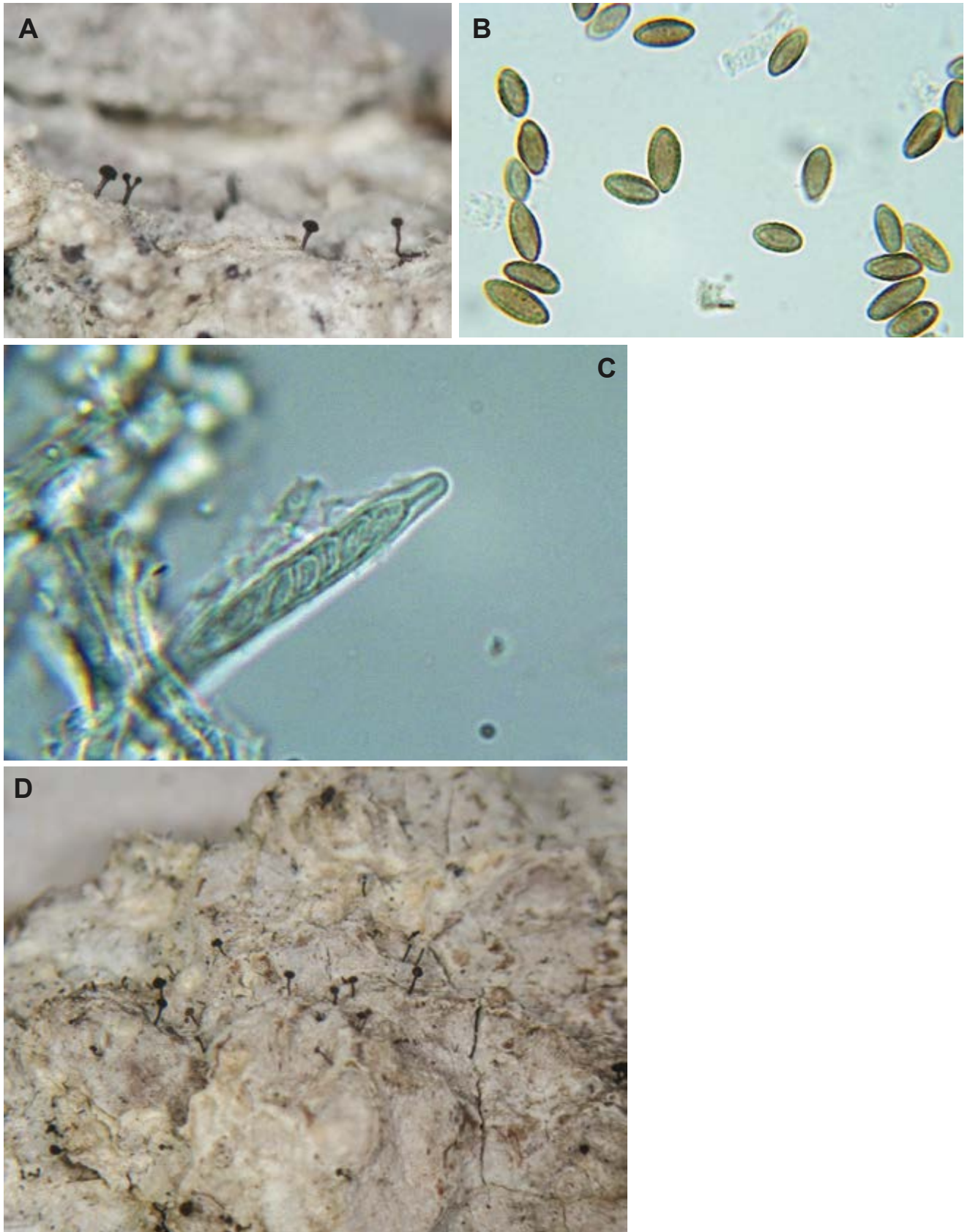


Plate 64. *Chaenothecopsis rubescens*. A. Ascomata. B. Spores. C. Ascus with thin apical canal. D. Ascomata growing on *Arthonia byssacea*. (A–D: Selva #10569)

Chaenothecopsis vainioana (Nádvorník) Tibell

Recent synonyms: none

Common name: Vainio's chaenothecopsis

FIELD SUMMARY — A non-lichenized, stalked pin, lacking pruina, with a non-mazaediate ascoma and reddish-brown epithecium, often parasitic on other lichen thalli. Lichenicolous, algicolous.

Diagnostic characters — *Chaenothecopsis vainioana* can be distinguished by its (1) parasitic or parasymbiotic association with free-living and lichenized *Trebouxia* and *Trentepohlia*, (2) 1-septate, ellipsoidal spores, (3) non-mazaediate ascomata, and (4) K+ yellow-brown and HNO₃+ reddish-brown reactions.

Description

THALLUS — immersed, indistinct. —photobiont absent.

ASCOMATA — black, sometimes with a brown tinge, 0.4–0.6 mm tall. —stalk outermost layer dark reddish-brown, 0.04–0.07 mm. —capitulum ovate, broad, 0.2–0.3 mm in diameter. —excipulum reddish-brown. —pruina absent or not differentiated. —mazaedium absent or not developed. —asci cylindrical, unevenly thickened, with a thick apex and a thin apical canal, 40–52 × 3–4 μm. —spores medium brown, 1-septate with a distinct septum, ellipsoidal, smooth, 8.0–10.0 × 2.5–3.5 μm.

CHEMISTRY — all portions of the ascomata K+ yellowish-brown. Excipulum, epithecium and outer portion of the stalk HNO₃+ slow reddish-brown.

Ecology — In Europe, *Chaenothecopsis vainioana* is known from bark on oaks, alder, ash and juniper and on lignin of birch and spruce. In addition, ascomata of *C. vainioana* often develop on the crust lichen *Arthonia vinosa*, including occasionally on the apothecia of that species. In Oregon, it is known from Douglas-fir bark in mature Douglas-fir forests at 1,200 feet in elevation. Associated species include: big leaf maple, grand fir and Pacific madrone.

Distribution — *Chaenothecopsis vainioana* is known from Europe and North America. In western North America, *C. vainioana* is known from Washington, Oregon, and California. In Oregon, *C. vainioana* is reported from Polk County within the Willamette Valley ecoregion.

Similar species — *Chaenothecopsis tasmanica* also has septate spores and is K+ red, but is HNO₃ negative. *Chaenothecopsis debilis* exhibits a rapid HNO₃+ purple reaction and is not associated with *Trentepohlia*. See *Chaenothecopsis rubescens* for a discussion on similar species.

References — Hardman and Stone (2015), Peterson (2012), Tibell (1999, p. 48).

References with color photos — Nordic Lichen Flora (1999, p. 87).

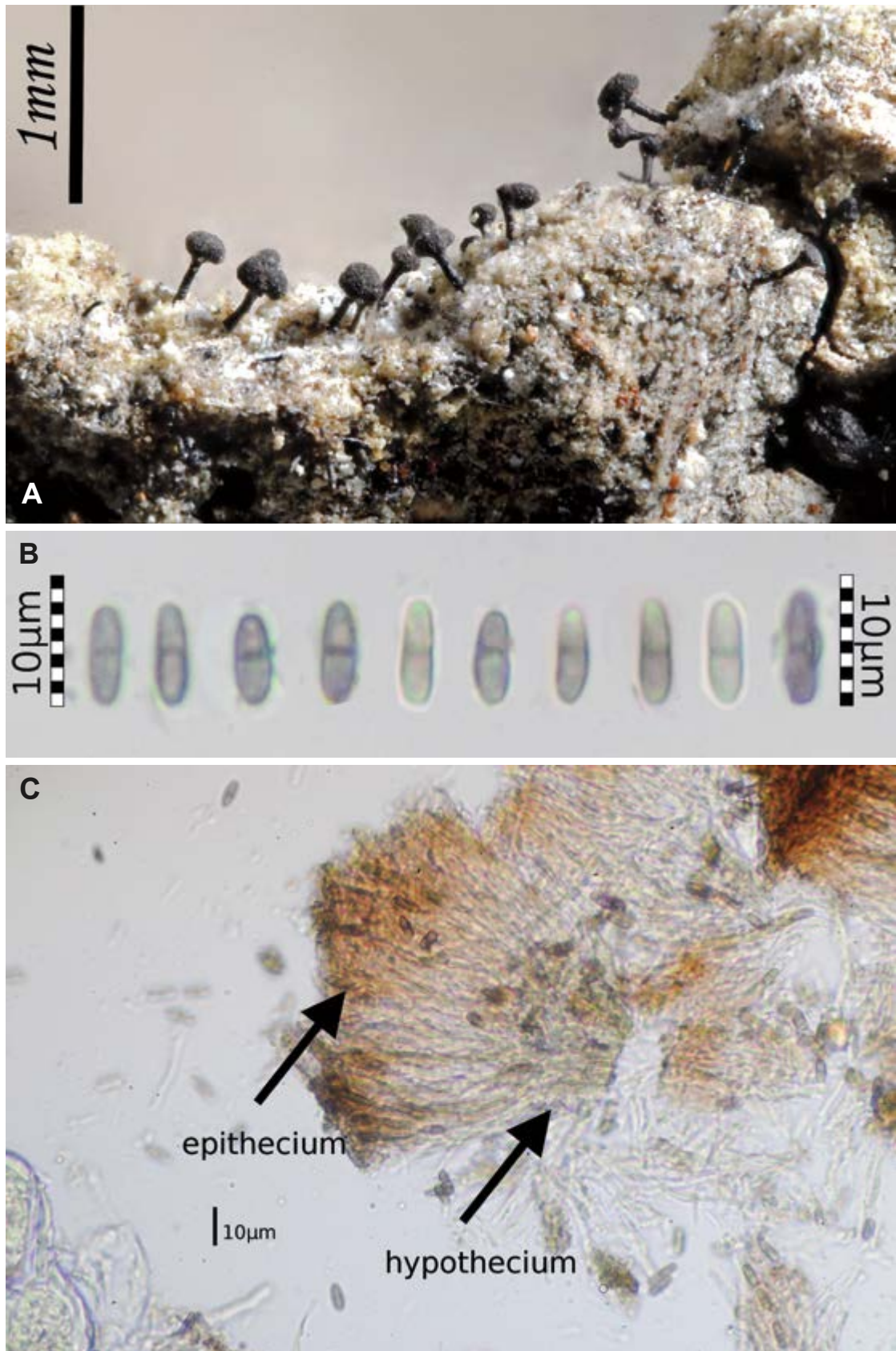


Plate 65. *Chaenothecopsis vainioana*. A. Ascomata. B. Spores. C. Reddish-brown epithecium. (A–C: Peterson Pers. Coll.)

Cladidium bolanderi (Tuckerman) B.D. Ryan

Recent synonyms:

Lecanora thamnitis (Tuckerman) Hafellner

Lecanora bolanderi Tuckerman

Common names: Bolander's cladidium lichen, Bolander's fog fingers.

Taxonomic note: *Cladidium* was separated from *Lecanora* by Ryan in 1989, when he examined three taxa previously described by Tuckerman in 1864 and 1866: *L. bolanderi*, *L. thamnitis*, and *L. phryganitis*. Ryan determined that *L. bolanderi* and *L. thamnitis* were indistinguishable as separate species, but were distinct from *L. phryganitis*, which was retained in *Lecanora*. *Cladidium bolanderi* was described as a monospecific genus which is differentiated from *L. phryganitis*, which has algae only near the surface, a soft medulla, yellow-green thallus, lateral apothecia, and soredia.

FIELD SUMMARY — A whitish to tan, minutely fruticose to crustose lichen with a green photobiont. Saxicolous.

Diagnostic characters — *Cladidium bolanderi* can be distinguished by its (1) coastal, often nitrophilous habitat, (2) crustose-fruticose habit, (3) positive amyloid reaction of the ascus, and (4) cartilaginous medulla with algal cells interspersed throughout, rather than in a single layer near the surface.

Description

THALLUS — fruticulose, often with more or less dichotomous branching, whitish to tan; branches about 0.5–1.0 mm wide and up to 1 cm tall, erect or decumbent toward the margin, forming irregular rounded sods to 10 cm broad, continuous to fissured with an uneven surface, rounded to irregularly compressed near the margin, irregularly thickened, tips papilliform; surface continuous and more or less even, not verrucose or granular, but pale spots often slightly raised and roughened, without vegetative propagules, with thick, white pruina; medulla dense, cartilaginous, with algae loosely interspersed throughout the interwoven, agglutinated hyphae, often present in radiating strands, with distinct lumina. —soredia and isidia absent. —pycnidia apical or subapical, immersed with a pale ostiole. —photobiont green (trebouxioid).

APOTHECIA — common, terminal, sessile or constricted at the base, disk pinkish-tan with whitish pruina, 0.5–4 mm, concave to plane, thalline with a thick margin to 0.5 mm, entire or becoming crenulate. Epithymenium pale, with granular crystals that appear bright under polarized light and are partly soluble in K reagent. —asci clavate to subcylindrical, about $50 \times 8\text{--}12 \mu\text{m}$, outer wall layer and gelatin strongly amyloid, tips with amyloid ring, uniseriate, 8-spored. —spores simple, ellipsoid to oblong-ellipsoid or ovoid-ellipsoid, (8) $10\text{--}14$ (16) \times 5.6 (8) μm , usually with one or two oil droplets.

CHEMISTRY — cortex C-, partly K+ yellow, KC+ yellowish, P-, N-; medulla C-, K-, KC-, P-, N-, I-; disks C-, K-, P-; ascus I+ blue.

Ecology — *Cladidium bolanderi* is known from large, exposed siliceous or sandstone, chert, granite or serpentine boulders, on horizontal to vertical surfaces on bluffs to 1,650 feet in elevation along the Pacific coast. It is hypermaritime in Oregon, and is likely to occur on strongly nitrophilous rocks coated in guano. The apothecia are often grazed by mollusks. Black lichen ascocarps (*Arthonia* sp.) and red areas (unidentified parasite) are often present on the thallus and disks.

Distribution — *Cladidium bolanderi* is endemic to western North America where it is known from Alaska, Oregon, and California. In Oregon, *C. bolanderi* is reported from Curry, Lincoln, and Tillamook counties within the Coast Range ecoregion.



Plate 66. *Cladidium bolanderi*. A. Fruticulose thallus on rock. B. Fruticulose thallus with apothecia. C. Lobe tips. D. Lobe tips with apothecium. (A–D: Rosentreter #8438)

Similar species — *Cladidium* is unique and separated from all other *Lecanora* species by its fruticulose habit and habitat on seacoast rock.

References — McCune (2012a, p. 103), Ryan (1989).

Gyalolechia stantonii (W.A. Weber) Söchting et al.

Recent synonym: *Caloplaca stantonii* W.A. Weber

Common name: Stanton's orange lichen, chamois ragwort, bicolor firedot lichen

Taxonomic note: Arup et al. (2013) proposed new combinations of the large heterogenous genus *Caloplaca* (*Teloschistaceae*) based on molecular data. Prior to this study, *Caloplaca* had over 1,000 species. They recognized 39 genera of which 31 are new or resurrected, including *Gyalolechia* and *Polycauliona*.

FIELD SUMMARY — A yellow-orange, areolate or subsquamulose crustose lichen with brick red or brownish-red apothecia and a green photobiont. Saxicolous.

Diagnostic characters — *Gyalolechia stantonii* can be distinguished by its (1) subsquamulose habit of convex areoles, (2) yellow-orange thallus color, (3) brownish-red apothecia generally greater than 0.8 mm wide, (4) spores generally greater than 13 μm , (5) cortex of thick-walled, anticlinally or irregularly arranged hyphal cells, (6) habitat of low elevation, usually crumbling acidic rock with maritime influences, especially intertidal or supralittoral rock, and (7) medullary crystals.

Description

THALLUS — yellow-orange to brownish-yellow, areolate to subsquamulose, verruculose, generally 1–5 cm but sometimes larger or coalescing; areoles 0.3–1.0 mm broad and 0.3–1.2 mm thick, convex but neither inflated nor flat, sometimes ascending from the substrate and exposing the white medulla; cortex and exciple of anticlinally or irregularly arranged, thick-walled hyphal cells; medulla well-developed, white, with numerous crystals. —soredia absent. —isidia present as somewhat globose isidioid structures on areolar margins. —pycnidia usually present, sparse to abundant, somewhat immersed or even with thallus, ferruginous to dark red. —photobiont green (*Trebouxia*).

APOTHECIA — few to abundant, 0.5–1.5 mm, ferruginous, brownish-red, or brick red, more or less rounded to slightly irregular, mostly sessile but occasionally raised, plane to convex, sometimes flexuose; proper margin in young apothecia smooth but often flexuose, slightly raised above or at the same level, concolorous with or somewhat paler than the disk; thalline margin hardly visible or thin, restricted at base of apothecia; epihymenium dirty brownish-orange; hypothecium and lower part of hymenium heavily peppered with oil droplets, up to 14 μm wide. —asci cylindrical, 51–72 \times 14–19 μm , 8-spored. —spores ellipsoid, 14.7–19.6 \times 5.9–7.7 μm .

CHEMISTRY — thallus and apothecia K⁺ purple, C⁻ or C⁺ slow rose to red, P⁻, I⁻; medulla K⁻, C⁻, P⁻ and I⁻.

Ecology — *Gyalolechia stantonii* is saxicolous on acidic, poorly consolidated and crumbling rocks. It is known from intertidal or supralittoral rocks, as well as from coastal mountains below 210 feet in elevation.

Distribution — *Gyalolechia stantonii* is endemic to western North America and is known from Oregon, California, and Mexico. In Oregon, *G. stantonii* is reported from Coos County within the Coast Range ecoregion.

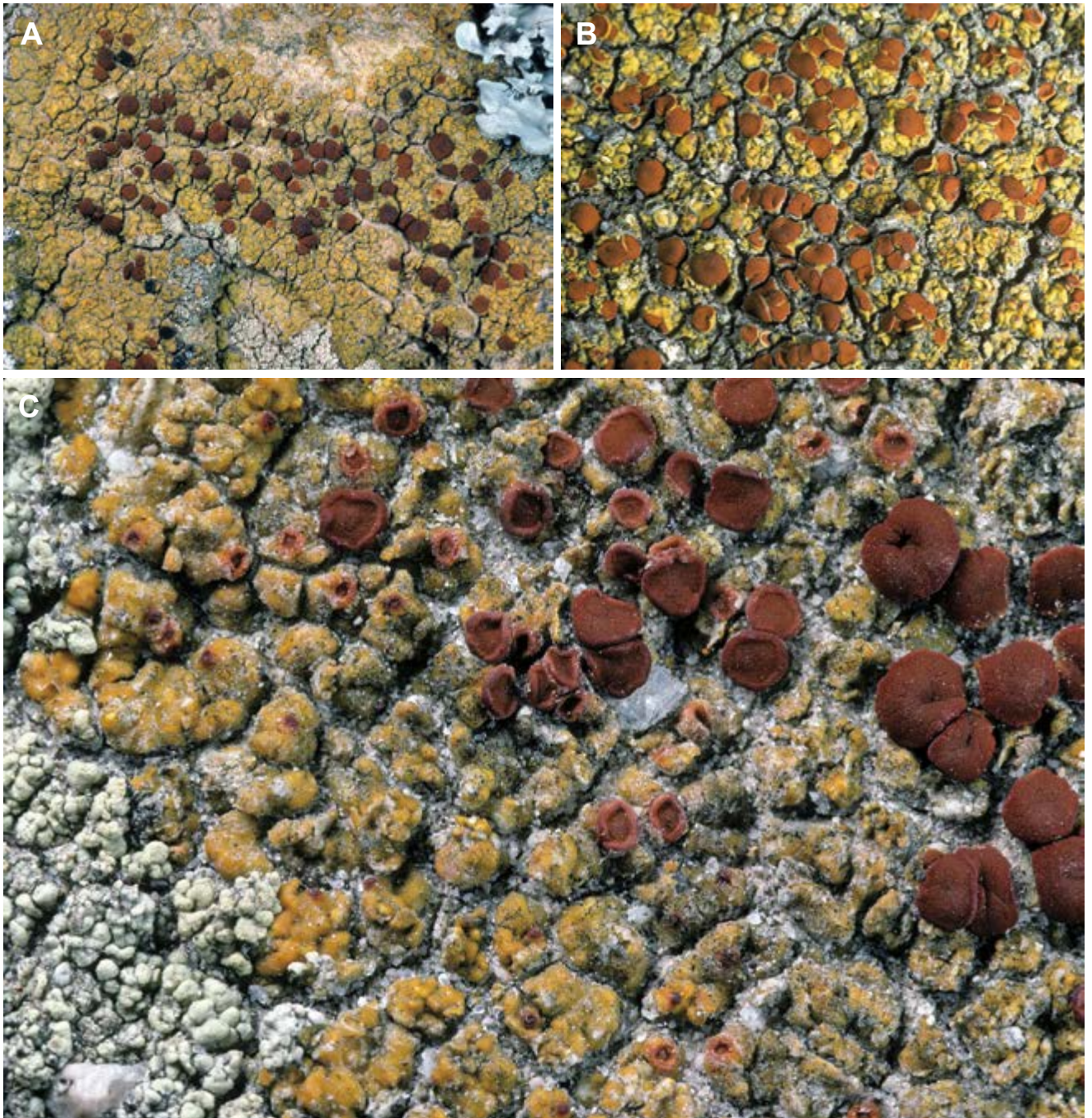


Plate 67. *Gyalolechia stantonii*. A–C. Crustose thallus with apothecia. (A–C: Sharnoff Pers. Coll.)

Similar species — *Polycauliona bolacina*, (= *Caloplaca bolacina*), has lighter orange apothecia, often a more reddish thallus of more or less inflated areoles, incised at the base, and a medulla that lacks crystals. It grows on acidic and calcareous rocks, but may also be found on soil and driftwood. The “*Caloplaca squamosa*” group has paraplectenchymatous cortices, apothecia generally less than 0.8 mm wide, and spores generally less than 13 µm.

References — Arup et al. (2013), Wetmore (2007, p. 212), Arup (1992).

References with color photos — Sharnoff (2014, p. 246).

Lecanora caesiorubella ssp. *merrillii* Imshaug and Brodo

Recent synonyms: none

Common name: Merrill’s rim lichen

Taxonomic Note: In his provisional saxicolous microlichens keys, McCune (2012a) notes, *Lecanora caesiorubella* ssp. *merrillii* “is one of five subspecies distinguished by Imshaug and Brodo (1996). More chemical variation was found by Lumbsch et al. (1997), leading Ryan et al. in Nash et al. (2004) to not recognize the subspecies. The subspecies are, however, retained here, because the few subspecies in our region appear to be ecologically and geographically distinct.”

FIELD SUMMARY — A white to gray crustose-subsquamulose lichen with thalline apothecia with heavily pruinose disks that are similar in color to the thallus, with a green photobiont. Epiphytic.

Diagnostic characters — *Lecanora caesiorubella* ssp. *merrillii* can be distinguished by its (1) whitish-gray to greenish-gray color, sometimes with a pale yellow or pinkish tinge, (2) subsquamulose habit, (3) thick lecanorine disk margin, (4) 8-spored ascus, (5) densely pruinose apothecial disks, and (6) chemistry.

Description

THALLUS — crustose, white to gray or greenish-gray, often with a pale yellowish or sometimes pinkish tinge, 2–8 cm broad, coalescing with adjacent thalli, well developed, almost subsquamulose but more commonly separated by cracks into irregular plates (areoles), that are flat or swollen and convex; surface smooth, sometimes powdery, usually thickened. —soredia and isidia absent. —photobiont green (*Trebouxia*).

APOTHECIA — stipitate or sessile, 1–2 (3) mm in diameter, round or more often crowded and irregularly shaped, flat to convex, pale tannish-yellow to rose or lavender, the surface often obscured by white pruina; thalline margin thick, raised and conspicuous; amphithecial medulla with abundant algae and small crystals of calcium oxalate. —asci 8-spored. —spores simple, elliptical or spindle-shaped, (11) 12–15 (16) × (6) 7–9 µm, hyaline, thin-walled.

CHEMISTRY — pseudocortex P+ red, K+ yellow; apothecial sections P+ red, K+ yellow, KC-, C-; apothecial disk C-; stipe and adjacent thallus tissues K+ yellow followed by the formation of red acicular crystals.

Ecology — *Lecanora caesiorubella* ssp. *merrillii* is mostly restricted to the coastal areas of southern California and Baja California and occurs mostly on oak, but also on a variety of trees and shrubs in chaparral and in oak-madrone forests of coastal southern California. In Oregon it is recorded on alders, pines, cottonwood, California bay laurel, photinia, cascara, and from fence posts and rails, including redwood fences.

Distribution — *Lecanora caesiorubella* ssp. *merrillii* is known from North America. In western North America, *L. caesiorubella* ssp. *merrillii* is known from Oregon, California, and Mexico (Baja California). In Oregon, *L. caesiorubella* ssp. *merrillii* is reported from Curry and Lane counties within the Coast Range and Klamath Mountains ecoregions.



Plate 68. *Lecanora caesiorubella* ssp. *merrillii*. A. Crustose thallus with apothecia. B. Apothecia. C. Ascus with spores. (A–C: McCune #18315)

Similar species — *Lecanora caesiorubella* ssp. *merrillii* is distinguished from many other corticolous and lignicolous *Lecanora* species by its 8-spored asci, C- apothecial disks, P+ red and K+ yellow apothecial margins, and the presence of norstictic acid in the apothecial stipe and adjacent thallus tissues. The presence of norstictic acid can be detected by observing narrow red crystals that form in slide mounts made with K reagent. Further, it differs from many similar corticolous and lignicolous species in the *L. varia* group by its lack of a strong yellow coloration. *Lecanora albella*, known from western Washington, generally has smaller apothecia with thinner margins and is usually lacking norstictic acid. *Ochrolechia pallescens* spores are 50–80 µm long, with thallus spot tests K-, C+, KC+ red, and P-.

References — McCune (2012a, p. 137), McCune et al. (1997), Imshaug and Brodo (1966).

References with color photos — Brodo et al. (2001, p. 376).

Microcalicium arenarium (Hampe) Tibell

Recent synonyms: none

Common name: sandwort microcalicium

FIELD SUMMARY — A non-lichenized, stalked black or grey pin that is parasitic or saprobic on free-living or lichenized *Stichococcus* or trebouxoid algae, or on *Psilolechia lucida*. Lichenicolous, algicolous.

Diagnostic characters — *Microcalicium arenarium* can be distinguished by its (1) greenish spore mass, (2) 1-septate spores with spiral ornamentation, (3) long stalk, and (4) lack of sclerotized hyphae in the mazaedium.

Description

THALLUS — immersed to superficial, often seen as a pale stain on the substrate. —photobiont absent.

ASCOMATA — variable in size with a long stalk. —stalk 0.6–1.8 (2.5) mm tall, (0.06) 0.08–0.1 (0.12) mm diameter, dull black or grayish, smooth or with a coarsely granular surface, outer surface with clusters of sclerotized hyphae, tapering abruptly to the capitulum. —capitulum spherical, (0.14) 0.2–0.3 mm in diameter. —excipulum reddish-brown in section, forming a small collar at the base of the capitulum. —pruina absent or not differentiated. —mazaedium protruding less than 0.3 mm, without sclerotized hyphae. —asci broadly ellipsoidal, 8–10 × 3–4.5 µm. —spores with one septum, broadly ellipsoidal, 6.0–7.0 (8.2) × 2.0–2.5 (2.9) µm, ornamented with spirally arranged ridges.

CHEMISTRY — spores and outer surface of the stalk and excipulum are K+ yellowish-brown.

Ecology — In Europe, *Microcalicium arenarium* is often found on road cutbanks, overhanging siliceous rocks on soil, roots, decorticated stumps and lignum, and on roots of fallen conifers in shaded and humid areas. It is often found growing with the yellow-green crustose lichen, *Psilolechia lucida* or on non-lichenized *Stichococcus* colonies, or mixed *Stichococcus* and trebouxoid algae. Tibell and Ryan (2004) add, “parasitic or commensalistic, on rocks, or roots, in shaded and humid localities, often under overhanging siliceous rocks.” In the Pacific Northwest, it is found in microhabitats sheltered from direct rain and direct light exposure such as rotting wood inside of large diameter tree boles in older coniferous forests at elevations less than 3,000 feet.

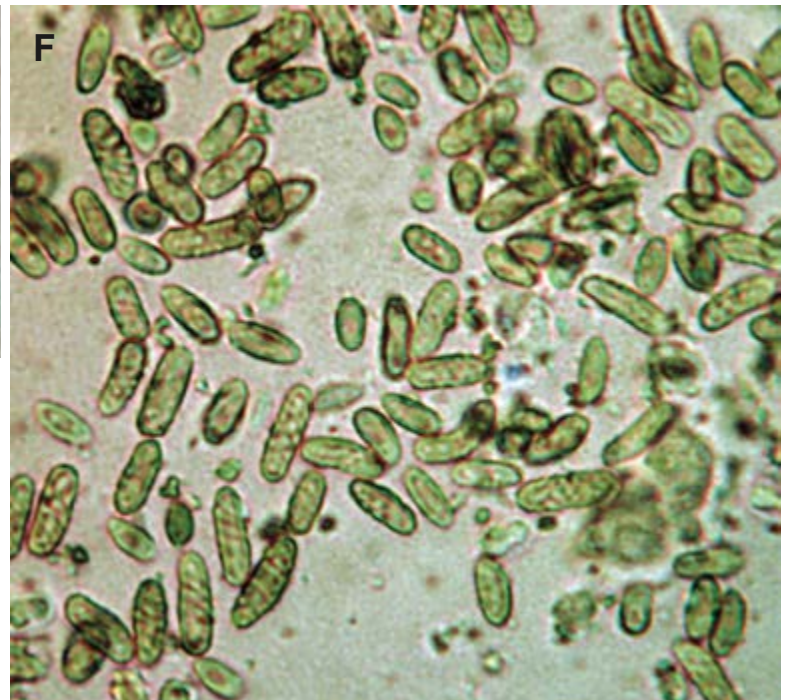
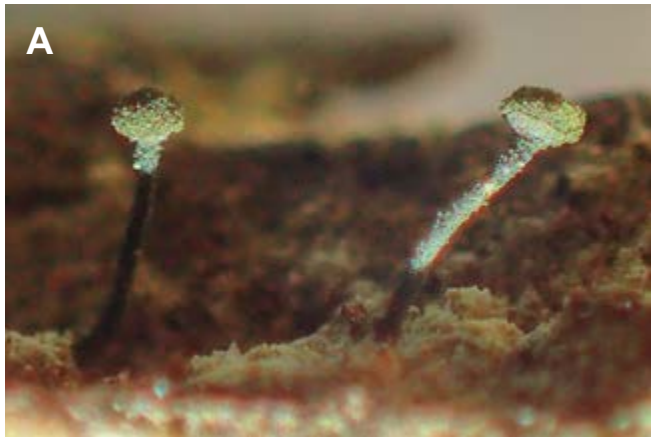


Plate 69. *Microcalicium arenarium*. A. Close-up of ascomata. B–D. Ascomata. E–F. Spores.
(A–F: Maertens OSC #143425)

Distribution — *Microcalicium arenarium* is known from Eurasia, North and South America, Australia, and New Zealand. In western North America, *M. arenarium* is known from British Columbia, Washington, Oregon, and California. In Oregon, *M. arenarium* is reported from Coos, Lane, and Multnomah counties within the Coast Range and West Cascades ecoregions.

Similar species — Ascomata of *Microcalicium* can be sessile or stalked. Diagnostic characters for the genus include: a true mazaedium, a greenish colored spore mass, narrow spores with parallel sides and spiral ornamentation, and lack of a photobiont. *Microcalicium ahlneri*, the other stalked member of the genus, has shorter stalks (0.4–1.1 mm) that widen gradually to the capitulum and has paraphyses that become sclerotized and persist in the mazaedium.

References — Tibell and Ryan (2004a, p. 670), Tibell (1999, p. 55).

References with color photos — Nordic Lichen Flora (1999, p. 89).

Ochrolechia subplicans ssp. *subplicans* (Nylander) Brodo

Recent synonym: *Pertusaria subplicans* Nylander

Common name: crabseye lichen

FIELD SUMMARY — A pale, whitish, crustose lichen with rosetiform apothecial verrucae of multiple ostioles interspersed with radiating sterile tissue, with a green photobiont. Saxicolous.

Diagnostic characters — *Ochrolechia subplicans* ssp. *subplicans* can be distinguished by its (1) saxicolous habitat, (2) unique, rosetiform, compound apothecial verrucae with multiple ostioles visible between radiating folds of sterile excipular tissue, (3) lack of soredia, and (4) C+ red medullary reaction.

Description

THALLUS — crustose, whitish-gray to yellowish-white or pale pinkish-white, usually more matte than shiny, thin, smooth, and continuous or becoming chinky-areolate; areoles rounded or flat. —soredia and isidia absent. —pycnidia absent. —photobiont green (*Trebouxia*).

APOTHECIAL VERRUCAE — pale, whitish to light tan or pinkish, (0.4) 1.2 (3.2) mm, compound, projecting above the thallus with several small, pale ostioles visible in the upper surface between radiating vertical columns of sterile excipular tissue, creating a rosette-like fruiting body; attachment almost umbilicate. —apothecia several per verruca, (0.3) 0.6 (0.9) mm. —asci clavate when mature but frequently deliquescing before spores are mature, 8-spored but sometimes 4- or 6-spored, biseriolate. —spores smooth, ovoid to ellipsoid, highly variable in size, 16–74 × 9–45 μm, walls double, thin, each wall 1–2 μm thick.

CHEMISTRY — cortex K-, C-, KC-, P-, UV-; medulla K-, C+ red, KC+ red, UV+, P-; asci I+ dark blue; upper surface of ascocarp C+ red, KC+ red.

Ecology — *Ochrolechia subplicans* ssp. *subplicans* is saxicolous and found mainly in the arctic. In the Pacific Northwest, *O. subplicans* ssp. *subplicans* is found on basalt on montane ridges with coastal influences.

Distribution — *Ochrolechia subplicans* ssp. *subplicans* is known from Asia and North America. In western North America, *O. subplicans* ssp. *subplicans* is known from Alaska, British Columbia, and Oregon. In Oregon, *O. subplicans* ssp. *subplicans* is reported from Clatsop County within the Coast Range ecoregion.

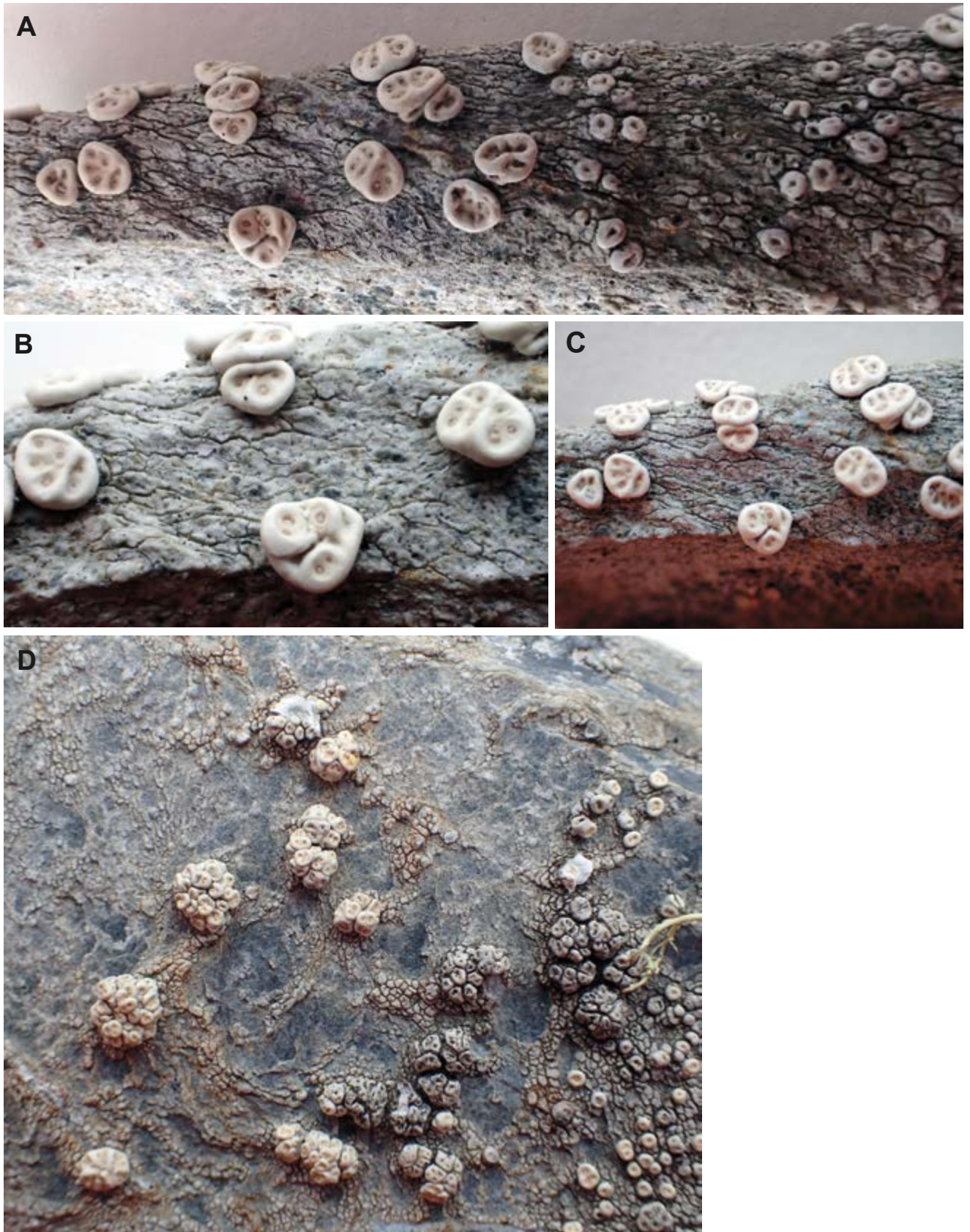


Plate 70. *Ochrolechia subplicans* ssp. *subplicans*. A. Apothecial verrucae. B–C. Crustose thallus with apothecial verrucae. D. Colonies of apothecial verrucae. (A–C: McCune #30801, D: McCune #30810)

Similar species — *Ochrolechia subplicans* ssp. *hultenii* is similar but it has simple apothecial verrucae with a single pore, is hypermaritime on supralittoral rocks, and is not yet known south of British Columbia. Brodo (1987), drawing upon previous work by Honegger (1982), described key morphological differences between *Ochrolechia* and *Pertusaria*: *Ochrolechia* species have thick-walled asci which dehisce through a terminal pore, while *Pertusaria* species have thin-walled asci which dehisce through a distinctive bivalved, longitudinal split. These features are enhanced with an iodine stain. Additionally, *Ochrolechia* species have thin to slightly thickened spore walls, while *Pertusaria* have single or double spore walls that are quite thick.

References — McCune (2012a, p. 251), Thomson (1997, p. 434), Brodo (1987), Dibben (1980).

Pyrrhospora quernea (Dickson) Körber

Recent synonyms: none

Common name: pyrrhospora lichen, sulphured crimson dot lichen

FIELD SUMMARY — A dull yellow or straw-colored crustose lichen of corticate granules with black to dark red-brown apothecia (but more often sterile), and a green photobiont. Epiphytic, rarely saxicolous.

Diagnostic characters — *Pyrrhospora quernea* can be distinguished by its (1) overall dull yellow color, (2) hypermaritime, mostly corticolous habitat, (3) thallus appearing to consist almost entirely of powdery to granular soredia, and (4) occasional presence of emarginate, black to dark red-brown apothecia.

Description

THALLUS — crustose, superficial, irregularly spreading, straw colored to dull sulfur yellow or greenish-yellow when shaded, occasionally with a reddish-brown tint, granular to farinose, sometimes areolate but often entirely dissolved into a mealy crust of soredia with an indistinct prothallus; prothallus black, up to 250 μm wide; medulla indistinct or absent. —soredia pale yellow, with a yellowish-brown hue, powdery to granular, composing most of the thallus and forming a thin, contiguous or thick and warty crust which may crack and form angular portions. —isidia absent. —pycnidia absent. —photobiont green (trebouxioid).

APOTHECIA — dark red-brown to rusty-brown or black, 0.3–1 mm wide, often absent; disk becoming strongly convex or irregular; proper margin biatorine, entire or undulate but often excluded; hymenium well-developed; epihymenium with scattered red-brown granules. —asci clavate, 8-spored. —spores ellipsoid, simple, (7) 8–12 (14) \times (5) 6–7 (8) μm .

CHEMISTRY — thallus K+ yellow, P- or P+ weakly yellow, C+ orange, KC+ orange-red, UV+ orange or red; hymenium I+ blue; epihymenium granules K+ dissolving purple. Yellow color reactions on a yellow thallus may be difficult to distinguish.

Ecology — *Pyrrhospora quernea* is known from oak bark but also from pine, cherry, elderberry, sagebrush, olive and toyon bush along the coast in western North America. Sometimes it is found on wood in open, well lit habitats in humid, warm, low elevation areas such as pine or oak woodlands, chaparral or sage communities from 60 to 1,320 feet in elevation. In the Pacific Northwest, *P. quernea* is hypermaritime and grows on a variety of conifers, hardwoods, and milled wooden structures.

Distribution — *Pyrrhospora quernea* is known from Eurasia, Africa, and North America. In western North America, *P. quernea* is known from Alaska, British Columbia, Washington, Oregon, and California. In Oregon, *P. quernea* is reported from Clatsop, Coos, Curry, Douglas, Lane, Lincoln, and Tillamook counties within the Coast Range ecoregion.

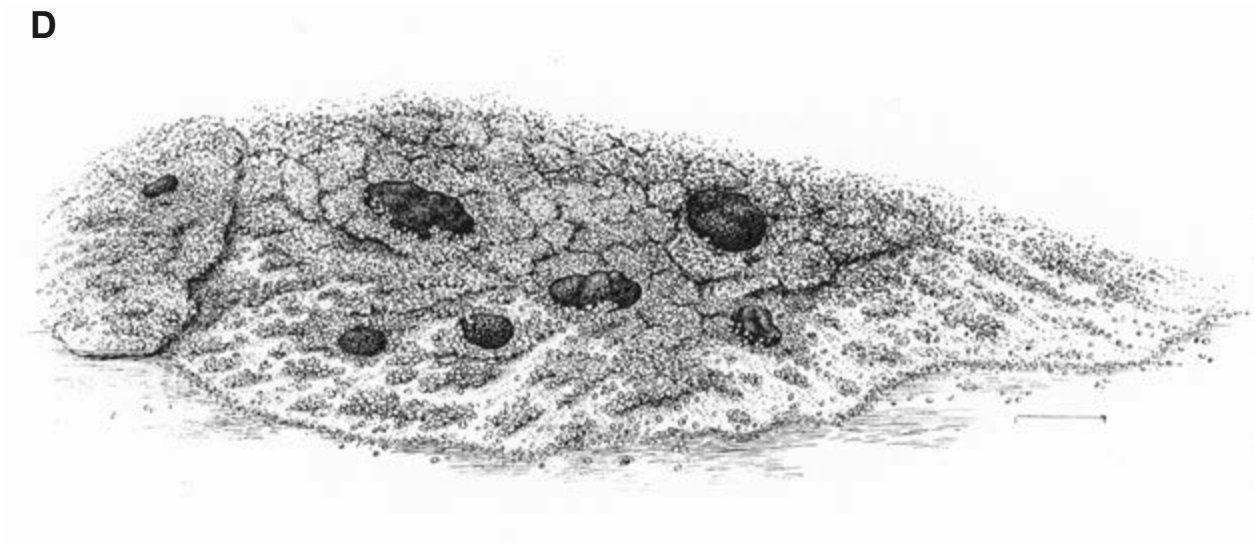


Plate 71. *Pyrrhospora quernei*. A. Thallus. B–C. Granular thallus. D. Mikulin drawing, edited by Peterson. (A–C: McCune #27214)

Similar species — *Ramboldia cinnabarina* and *R. gowardiana*, both formerly within the taxon *Pyrrhospora*, also occur on bark and are known from western North America. Both species have orange-red apothecia rather than the black to dark brown or dark reddish-brown apothecia of *Pyrrhospora quernea*. In addition, *Ramboldia gowardiana* has a grayish thallus that is generally fertile and lacks soredia. *Ramboldia cinnabarina* has a consistently thin whitish-cream thallus. In western North America, *R. cinnabarina* is usually sterile with whitish-cream colored soredia localized in small, rounded soralia.

References — Zduńczyk and Kukwa (2014), Ryan et al. (2004, p. 438), Spribille and Hawk (2003).

References with color photos — Sharnoff (2014, p. 340), Lendemer (2013, p. 53), Leshner et al. (2003, p. 167), Brodo et al. (2001, p. 615).

Schaereria dolodes (Nylander) Schmull and T. Spribille

Recent synonyms: *Lecidea dolodes* Nylander

Common name: tricky lecidea

FIELD SUMMARY — A chestnut to olive-brown crustose lichen with sessile black apothecia and a green photobiont. Epiphytic.

Diagnostic characters — *Schaereria dolodes* can be distinguished by its (1) chestnut brown, inflated (bullate) thallus, (2) black, lecideine apothecia, (3) lack of soredia, (4) small, globose spores, (5) *Schaereria*-like asci: cylindrical with faintly amyloid thin walls, 8-spored and lacking a tholus, (6) asci and paraphyses separating easily, and (7) corticolous habitat.

Description

THALLUS — crustose, areolate, bullate-areolate, or verrucose in distinct areoles, chestnut to olive-brown with a yellowish, reddish, or greenish tinge, smooth, 75–115 µm thick with a dark brown to black prothallus; medulla white; algal layer 60–100 µm thick. —soredia and isidia absent. —pycnidia frequent, brown, reddish-brown, or black. —photobiont green (trebouxioid).

APOTHECIA — black, single, sessile to substipitate, lecideine, 0.7–1.0 (1.2) mm; disk black, concave to more or less plane or slightly convex, upper margin prominent, upper portion concolorous with disk and becoming brown towards the base; proper exciple black to brown or dark bluish or dark greenish; hymenium non-gelatinized, allowing the asci and paraphyses to easily separate. —asci cylindrical, 8-spored, uniseriate, lacking a tholus. —spores globose, hyaline, thin walled, (5) 6–7.8 (10) µm, sometimes with purple granules (bright turquoise in K).

CHEMISTRY — two chemotypes: (1) K-, C-, KC-, P-, and (2) K+ yellow, C-, KC-, P+ yellow, sometimes indistinct; UV-; asci I+ blue; epithecium K+ intensified green or turquoise.

Ecology — In the northern part of its range, *Schaereria dolodes* is known from bark on conifer trees in semi-shaded areas at 1,350 to 4,500 feet in elevation. Plant associations include: Douglas-fir/ninebark and Douglas-fir/oceanspray. In Oregon, *S. dolodes* is known from suboceanic climates in moist, low-elevation forests, but is also found at more inland sites west of the Cascades in relatively dry sites such as exposed ridgelines and isolated trees on edges of dry, rocky meadows. In eastern Oregon it is recorded on wood and bark of Douglas-fir. In the southern part of its range, *S. dolodes* is known from elevations up to 10,950 feet on Douglas-fir on west to south facing slopes. It has also been recorded on birch, larch, western red cedar, burnt logs, and from incense cedar and hairy manzanita along the coast.



Plate 72. *Schaereria dolodes*. A. Crustose thallus with apothecia. B. Thin-walled asci with globose spores.
(A: McCune #10851, B: McCune #28532)

Distribution — *Schaereria dolodes* is endemic to western North America where it is known from British Columbia, Washington, Oregon, California, Idaho, Montana, and Arizona. In Oregon, *S. dolodes* is reported from Benton, Douglas, Grant, Josephine, Lane, and Linn counties within the Willamette Valley, Klamath Mountains, West Cascades, and Blue Mountains ecoregions.

Similar species — *Schaereria* contains both epiphytic and saxicolous species. Epiphytic species known to occur in the Pacific Northwest include: *Schaereria corticola*, *S. parasemella*, *S. brunnea*, and *S. dolodes*. *Schaereria brunnea* is known from Southeastern Alaska and northern to east-central British Columbia on fine western hemlock twigs in older boreal rain forests. It is the only epiphytic *Schaereria* species with brown pigments in the apothecia rather than blue-green, and has broadly ellipsoid spores measuring (18) 20 (24) × (14) 16 (20) μm. *Schaereria corticola* favors alder and birch bark and has small, punctiform soralia and subspherical to broadly ellipsoid spores (13–16 × 9–12 μm) that appear thick-walled due to a gelatinous epispore. It is known from near the coast from Alaska to California, but also inland to the western slopes of the Rocky Mountains in British Columbia. *Schaereria parasemella* has broadly ellipsoid, thick-walled spores that measure 12–15 × 10–11 μm. It is known from the west slopes of the Rocky Mountains in British Columbia and Montana. Both *S. corticola* and *S. parasemella* lack a well-developed thallus. Spribille et al. (2009) remark that both are common in British Columbia and the Pacific Northwest, and endorse Poelt's position that they are likely an asexual-sexual species pair.

References — McCune (2012a, p. 328), Spribille et al. (2009), Schmull and Spribille (2007, p. 396), Schmull and Spribille (2005), Hertel (2004, p. 503), Kantvilas (1999).



Plate 72a. *Schaereria dolodes*. A. Crustose thallus with apothecia. (A: McCune #10851)

Sclerophora amabilis (Tibell) Tibell

Recent synonyms: none

Common name: sclerophora lichen

FIELD SUMMARY — A stalked, brownish pin lichen with yellow or white pruina and a pinkish to pale spore mass. Epiphytic.

Diagnostic characters — *Sclerophora amabilis* can be distinguished by its (1) pale, often salmon-colored spore mass, (2) spore size of 5–6 μm , (3) lemon yellow pruina, (4) sheath-like collar around the capitulum, and (5) tall ascomata.

Description

THALLUS — crustose, immersed. —photobiont green (*Trentepohlia*).

ASCOMATA — 0.6–1.7 mm tall. —stalk brown to reddish-brown or yellow, 0.1–0.2 mm diameter, uppermost portion of stalk yellow or white pruinose. —capitulum spherical, 0.4–0.5 mm in diameter, surrounded by a sheath-like collar 40–50 μm thick detached at its base. —excipulum covered by a pale to white pruina. —pruina yellow when young, maturing pale to lemon yellow or white. —mazaedium when mature, salmon to pale ochraceous. —asci stalked, cylindrical to narrowly clavate. —spores simple, globose to broadly ellipsoidal, 5–6 (7) μm , hyaline with verruculose ornamentation.

CHEMISTRY — No secondary substances have been identified.

Ecology — In Europe, *Sclerophora amabilis* is known from lignin of ash, maple, elm, and beech along the fringes of old deciduous stands. In western Oregon it is known from the bark of Oregon white oak, Oregon ash, big leaf maples, and other hardwoods.

Distribution — *Sclerophora amabilis* is known from Eurasia, North America, and New Zealand. In western North America, *S. amabilis* is known from British Columbia, Oregon, and Montana. In Oregon, *S. amabilis* is reported from Clackamas, Douglas, Jackson, Josephine, Lane, and Marion counties within the Klamath Mountains and West Cascades ecoregions.

Similar species — *Sclerophora* can be distinguished from other pin lichen genera by the pale color of the spore mass, presence of a stalk that is narrower than the capitulum, a true mazaedium, and *Trentepohlia* as a photobiont. *Sclerophora coniophaea* ascomata are covered in a dark reddish-brown pruina that is K+ violet, and has spores 4.5–6.0 μm . *Sclerophora peronella* has a pale colored stalk, with spores 3.0–3.5 μm . Both *S. farinacea* and *S. nivea* have a pale yellow to white pruina and spores 7–8 μm . None of these species have the sheath-like collar of *Sclerophora amabilis*.

References — Tibell (1999, p. 62), Selva and Tibell (1999).

References with color photos — Nordic Lichen Flora (1999, p. 90).



Plate 73. *Sclerophora amabilis*. A–C. Ascomata. D. Ascomata with sheath-like collar around the capitulum.
(A–D: Loring Pers. Coll.)

Sclerophora peronella (Acharius) Tibell

Recent synonyms: none

Common name: sclerophora lichen

FIELD SUMMARY — A stalked pin lichen with white pruina and pale spore mass. Epiphytic.

Diagnostic characters — *Sclerophora peronella* can be distinguished by its (1) pale color of the ascomata, (2) white pruina, (3) small, smooth spores, and (4) reddish color of the stipe core.

Description

THALLUS — crustose, immersed. —photobiont green (*Trentepohlia*).

ASCOMATA — flesh colored, or covered in a white pruina, 0.5–0.8 mm tall. —stalk dull grayish, 0.06–0.12 mm diameter, with a reddish central core most easily seen in water. —capitulum hemispherical, 0.2–0.3 mm wide. —excipulum surface with a 3–4 μm thick yellowish-red layer. —pruina white. —mazaedium pale carneous to ochraceous or covered with a white pruina. —asci stalked, cylindrical. —spores simple, globose, smooth, 3.0–3.5 (3.6) μm .

CHEMISTRY — pruina K⁺ violet; otherwise, no secondary substances have been identified.

Ecology — In Europe, *Sclerophora peronella* is known from bark and lignin of old maples, beech, ash, oak, basswood, and elm trees in humid to shaded habitats. It is also recorded from alder, birch, poplar and crabapple trees. It is known to occur on conifer substrates as well, including western hemlock in Washington. In Polk County, Oregon, it is known from bark and lignin of big leaf maples and on lignin of grand fir basal scars at 1,200 feet in elevation. In other parts of Oregon it has been found on oaks, big-leaf maple, alder, and other hardwoods.

Distribution — *Sclerophora peronella* is known from Europe and North America. In western North America, *S. peronella* is known from British Columbia, Washington, Oregon, and Wyoming. In Oregon, *S. peronella* is reported from Benton, Clackamas, Douglas, Jackson, Lane, Linn, Multnomah, Polk, Tillamook, Wasco, and Yamhill counties within the Coast Range, Willamette Valley, Klamath Mountains, and West Cascade ecoregions.

Similar species — See *Sclerophora amabilis* for a discussion on similar species.

References — Hardman and Stone (2015), Tibell (1999, p. 64), Selva and Tibell (1999).

References with color photos — Nordic Lichen Flora (1999, p. 90).

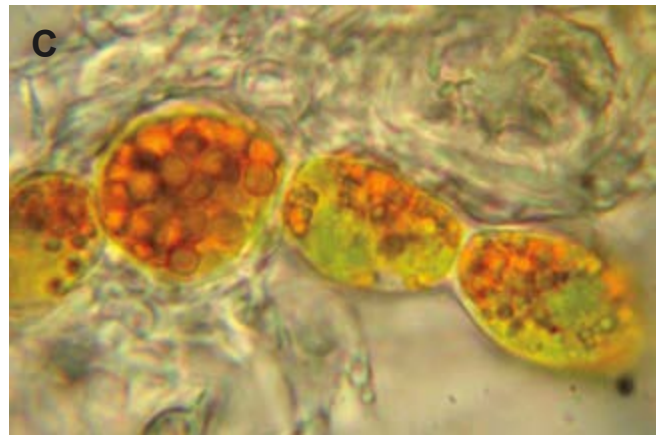
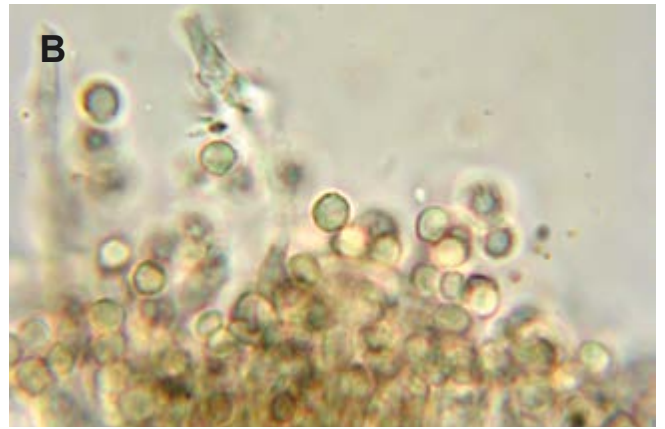


Plate 74. *Sclerophora peronella*. A. Ascoma. B. Spores. C. *Trentepohlia photobiont*. D. Ascoma.
(A: Loring Pers. Coll., B–D: Exeter 2013-11)

Sigridea californica (Tuckerman) Tehler

Recent synonym: *Dirina californica* Tuckerman

Common name: California dirina

FIELD SUMMARY — A whitish crustose lichen with dark colored apothecia covered in a white pruina and with a green photobiont (*Trentepohlia*). Epiphytic, rarely saxicolous.

Diagnostic characters — *Sigridea californica* can be distinguished by its (1) white to cream-colored, crustose thallus, (2) epiphytic habitat, (3) absence of soredia, (4) heavily pruinose, thalline apothecia with dark disks and a hypothecium that extends to the substrate, (5) hyaline, 3-septate, fusiform spores, and (6) C-, KC-, P+ yellow thallus.

Description

THALLUS — crustose, white, thin (0.1–0.3 mm), lacking a prothallus, sometimes becoming areolate; cortex sometimes poorly developed, epruinose. —medulla white, thin or sometimes not evident. —soredia and isidia absent. —pycnidia present, 0.1 mm in diameter, with bacilliform conidia $2\text{--}4 \times 1\text{--}2 \mu\text{m}$. —photobiont green (*Trentepohlia*).

APOTHECIA — sessile to substipitate, 0.2–1 mm; disk black, strongly white pruinose, convex, margin frequently somewhat undulate, thalline exciple protruding above the disk, with or without a cortex, hypothecium extending to the substrate. —asci clavate, 8-spored. —spores fusiform, curved, 3-septate, hyaline, $13\text{--}15 (18) \times 3\text{--}4 (5) \mu\text{m}$.

CHEMISTRY — thallus K- or K+ yellowish, C-, KC-, P+ yellow; apothecial disk C-, K-, P+ yellow.

Ecology — *Sigridea californica* is known from coastal regions on bark of oak, toyon, chamise, and conifers (*Pinus*), but is also lignicolous on fence posts or natural wood surfaces; rarely on rock.

Distribution — *Sigridea californica* is endemic to western North America where it is known from Oregon and California. In Oregon, *S. californica* is reported from Curry County within the Coast Range ecoregion.

Similar species — *Sigridea* is differentiated from its former taxon, *Dirina*, by its C- and KC- cortex and by having a hypothecium that extends to the substrate, visible in apothecial cross sections. *Dirina* has a C+ red and KC+ red cortex and a convex hypothecium that does not extend to the substrate.

References — Tehler (2002, p. 461), Brodo et al. (2001, p. 132), Tehler (1993).

References with color photos — Nash III et al. (2007 color plates).

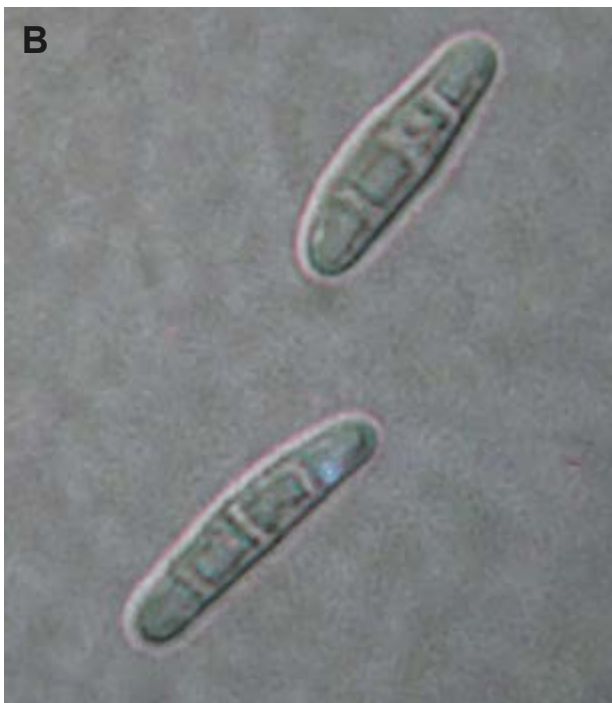


Plate 75. *Sigridea californica*. A. Crustose thallus with pruinose apothecia. B. 3-septate spores. (A–B: McCune #18300)

Texosporium sancti-jacobi (Tuckerman) Nádvořík

Recent synonyms: *Cyphelium sancti-jacobi* (Tuckerman) Zahlbruckner

Common name: woven-spored lichen

FIELD SUMMARY — A whitish to light gray soil crust lichen with distinctive olive green, mazaediate apothecia with yellow pigment in the cylindrical to conical, thalline margin, and a green photobiont. Terricolous.

Diagnostic characters — *Texosporium sancti-jacobi* can be distinguished by its (1) thin grayish, granular thallus, (2) tall, cup-like, lecanorine apothecia, often with a yellow rim, (3) olive-green mazaedia, and (4) unique spore structure.

Description

THALLUS — crustose, white to pale gray, forming small colonies usually less than 3 cm broad, granular or verrucose, lacking a prothallus; cortex 20–30 µm thick, hyaline, composed of decaying photobiont cells and granular crystals. —medulla loose, gray, floccose. —soredia and isidia absent. —pycnidia absent. —photobiont green (chlorococcoid).

APOTHECIA — sessile, cylindrical to conical, 0.5–0.8 (1.5) mm, tending to occur in 1 cm diameter clusters; thalline margin with yellow pigments. —mazaedium olive-green to black with a yellow to yellow-green pruina. —asci soon disintegrating, 8-spored. —spores have a unique structure. As the brown, 1-septate, short-ellipsoid spores develop, the ascus ruptures and surrounding paraphyses reorganize, forming a tight, thick coat over each spore; septa often obscured by the enclosing hyphae; spores measure 19–26 × 10–14 µm, including the hyphal coat, (20) 35–44 × (16) 19–26 (30) µm.

CHEMISTRY — thallus K-, C-, KC-, P-.

Ecology — *Texosporium sancti-jacobi* is known from mature sagebrush habitats with scattered juniper on well decomposed organic matter in areas with little to no grazing, or recent fire history. It is reported from arid intermountain regions up to 3,000 feet in elevation on old, decomposed bunchgrass rootwads. It is also found on rabbit pellets and sometimes directly over non-calcareous soils.

Distribution — *Texosporium sancti-jacobi* is a western North American endemic where it is known from Washington, Oregon, California, and Idaho. In Oregon, *T. sancti-jacobi* is reported from Gilliam, Jefferson, Morrow, Sherman, and Wasco counties within the Blue Mountain and Columbia Basin ecoregions.

Similar species — *Lecanora* species also have lecanorine apothecia, often with dark, pruinose apothecial disks and pale thalli. Furthermore, they can be found growing in the same habitats and can possibly be confused with *Texosporium*. *Lecanora* apothecia, however, are generally short and broad, lack the olive-green spore mass, and are non-mazaediate.

References — McCune and Rosentreter (1992), Tibell and Hofsten (1968), Weber (1967).

References with color photos — Sharnoff (2014, p. 354), McCune and Rosentreter (2007), Rosentreter et al. (2007, p. 83).

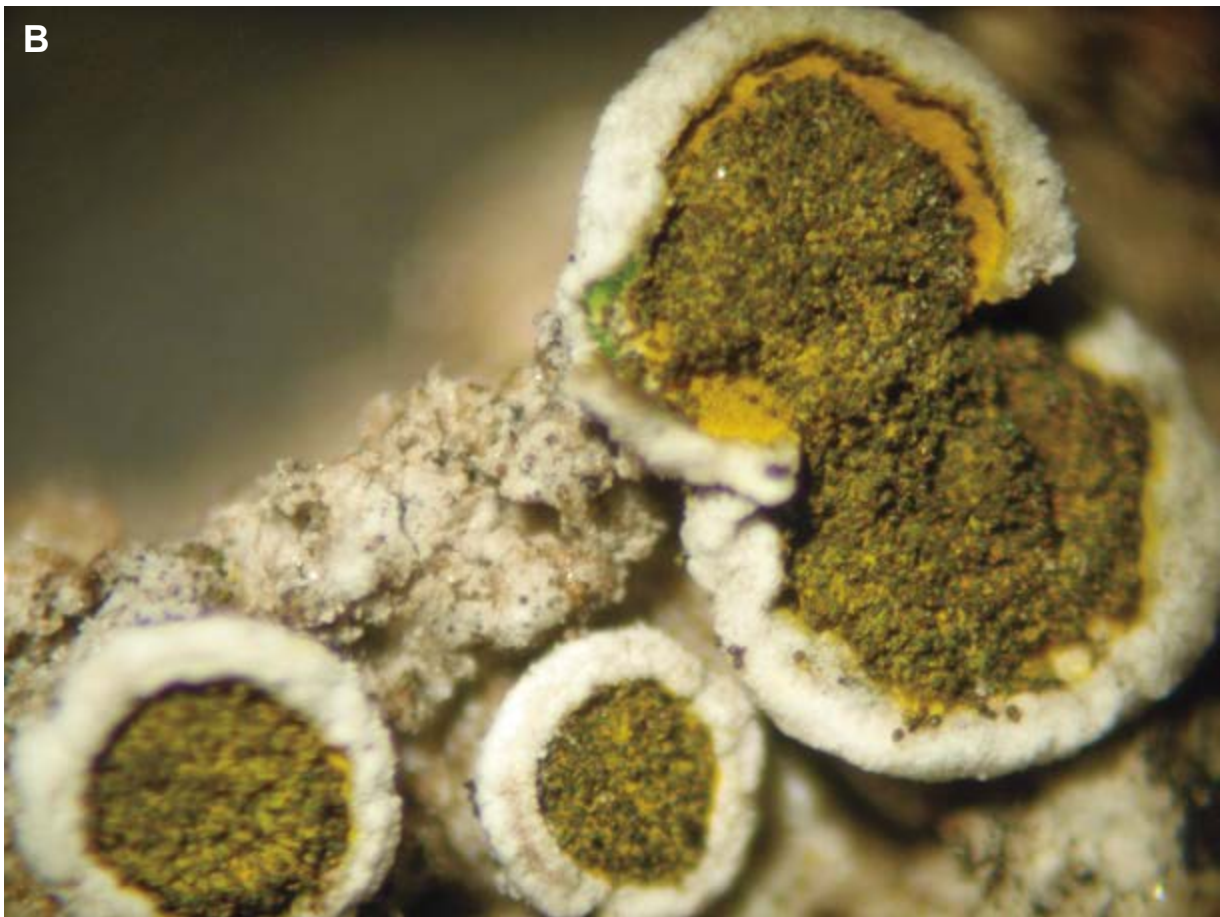


Plate 76. *Texosporium sancti-jacobi*. A. Thallus with apothecia. B. Apothecia with olive mazaedia. (A–B: Loring Pers. Coll.)

Thelenella muscorum var. *octospora* (Nylander) Coppins and Fryday

Recent synonyms:

Chromatochlamys muscorum var. *octospora* (Nylander) H. Mayrhofer and Poelt

Verrucaria muscicola var. *octospora* Nylander

Pyrenidium octosporum Looman

Microglæna muscorum var. *octospora* (Nylander) Cretzoiu

Common name: chromatochlamys lichen

FIELD SUMMARY — A crustose to subfruticose lichen with perithecioid ascomata and a green photobiont. Lichenicolous, muscicolous, or terricolous.

Diagnostic characters — *Thelenella muscorum* var. *octospora* can be distinguished by its (1) white to variously colored thin, membranous thallus, (2) immersed to emergent perithecia, (3) 8-spored asci, and (4) 3-septate spores.

Description

THALLUS — crustose, thin (0.1–0.3 mm), white to greenish or bluish-gray, smooth to roughened, divided into irregular areoles, occurring over substrate in scattered, irregular lumps or grape-like clusters; fertile areoles somewhat inflated. —soredia and isidia absent. —pycnidia filiform. —photobiont green (trebouxioid).

PERITHECIA — few, pale to dark brown, three-quarters to completely immersed, 0.2–0.3 mm, rounded to broadly pyriform; ostiole small, black. —asci clavate, 8-spored, $65 \times 28 \mu\text{m}$, double-walled with a tholus (apical thickening). —spores elliptical to elongate-ovoid, tapered more on one end than the other, 3-septate, submuriform to muriform, hyaline to brownish, (40) $55\text{--}65 \times (7) 14.5\text{--}19 (20) \mu\text{m}$. Looman (1962) reports much smaller 3-septate spores, $20\text{--}26 \times 7\text{--}10 \mu\text{m}$.

CHEMISTRY — asci I-.

Ecology — In Oregon, *Thelenella muscorum* var. *octospora* is considered a component of biological soil crusts in semi-arid shrub-steppe and grasslands at elevations up to 4,000 feet. Associated vegetation includes juniper, sagebrush, Idaho fescue and bluebunch wheatgrass. In Colorado, it is known from talus and subalpine forests from 10,400 to 11,000 feet in elevation. In Europe, *T. muscorum* var. *octospora* is most often reported from moss over trees, and rarely on moss over soil or basic rock, including limestone (Fryday and Coppins, 2004).

Distribution — *Thelenella muscorum* var. *octospora* is known from Eurasia and North America. In western North America, *T. muscorum* var. *octospora* is known from Oregon, California, Idaho, Montana and Colorado. In Oregon, *T. muscorum* var. *octospora* is reported from Grant and Jefferson counties within the Blue Mountains ecoregion.

Similar species — *Thelenella muscorum* var. *muscorum* has 2–4 spores per ascus, generally larger spores ($60\text{--}90 \times 15\text{--}25 \mu\text{m}$), and has not been found in Oregon. Fryday and Coppins (2004) compare the similar *Strigula confusa*, *Thelenella larbalestieri*, and *T. muscorum* var. *octospora* in a table of characters including: ecology, thallus, photobiont, perithecia, exciple, and ascospores. In partial summary, *Strigula confusa* has distinctive large, muriform spores and *Trentepohlia* as a photobiont, while *Thelenella* species have a trebouxioid photobiont. *Thelenella larbalestieri* has a brown cracked thallus, while *T. muscorum* var. *octospora* has a white, thin, membranous thallus.

References — McCune (2012a, p. 337), Fryday and Coppins (2004), Weber and Wittmann (1992), Mayrhofer (1987), Looman (1962).



Plate 77. *Thelenella muscorum* var. *octospora*. A. Thallus over moss. B. Close-up of thallus over moss. C. Thallus over moss. D. Perithecia. (A–D: Loring Pers. Coll.)

Thelomma mammosum (Hepp) A. Massalongo

Recent synonyms: none

Common names: rock nipple lichen, doll's eyes

FIELD SUMMARY — A crustose, mazaediate lichen with the apothecia sunken in thallus tissues and a green photobiont. Saxicolous.

Diagnostic characters — *Thelomma mammosum* can be distinguished by its (1) grayish thallus, (2) apothecia immersed in protruberant, volcano-shaped areoles, (3) well developed, black mazaedium, (4) non-septate spores, and (5) maritime habitat on rock.

Description

THALLUS — crustose, light gray or with a pale pinkish-brown or yellow-olive tinge, dull, verrucose, to 11 cm broad, areolate-warty, non-fertile areoles thin (to 1 mm) and 0.5–0.8 mm wide, with a black prothallus. —soredia and isidia absent. —pycnidia black, immersed, spherical to elongate, 0.08–0.14 mm. —photobiont green (*Trebouxia*).

APOTHECIA — common, to 1.2 mm wide, partially or completely immersed in raised areoles to 2 mm tall, and becoming basally constricted. —mazaedium 0.25–0.35 mm in diameter, flat to convex, black; thalline margin thick, smooth. —asci cylindrical, 6 to 8-spored, uniseriate. —spores brown to brown-black, spherical, simple, (9) 13–16 (17) μm , irregularly and faintly striately ornamented.

CHEMISTRY — thallus K-, C-, KC+ rose-red, P-, UV+ white; mazaedium K+ red, P+ yellow to red.

Ecology — *Thelomma mammosum* is known from sandstone and rocks in the supralittoral zone along the western North American coast. Sharnoff (2014) mentions this species is common along the California coast, but is more common in southern California than to the north. In California and the Canary Islands, *T. mammosum* is not restricted to the supralittoral zone as it is in the Pacific Northwest, and is found inland up to 2,400 feet in elevation.

Distribution — *Thelomma mammosum* is known from Europe and North America. In western North America, *T. mammosum* is known from British Columbia, Oregon, California, and Mexico (Baja California). In Oregon, *T. mammosum* is reported from Lincoln County within the Coast Range ecoregion.

Similar species — *Thelomma ocellatum*, common east of the Cascade Mountains, and *T. occidentale*, occasional in western Oregon, occur on wood. *Thelomma santessonii*, known from southern California, also has non-septate spores but has a distinctly yellow thallus with an olivaceous tinge, generally larger fertile areoles (1.4–2.1 mm), and is KC-. Other western North American *Thelomma* species have septate spores and often occur on wood.

References — McCune (2012a p. 340), Tibell and Ryan (2004b, p. 534), Noble (1982, p. 190).

References with color photos — Sharnoff (2014, p. 356), Nash III et al. (2004, color plates), Brodo et al. (2001, p. 680).

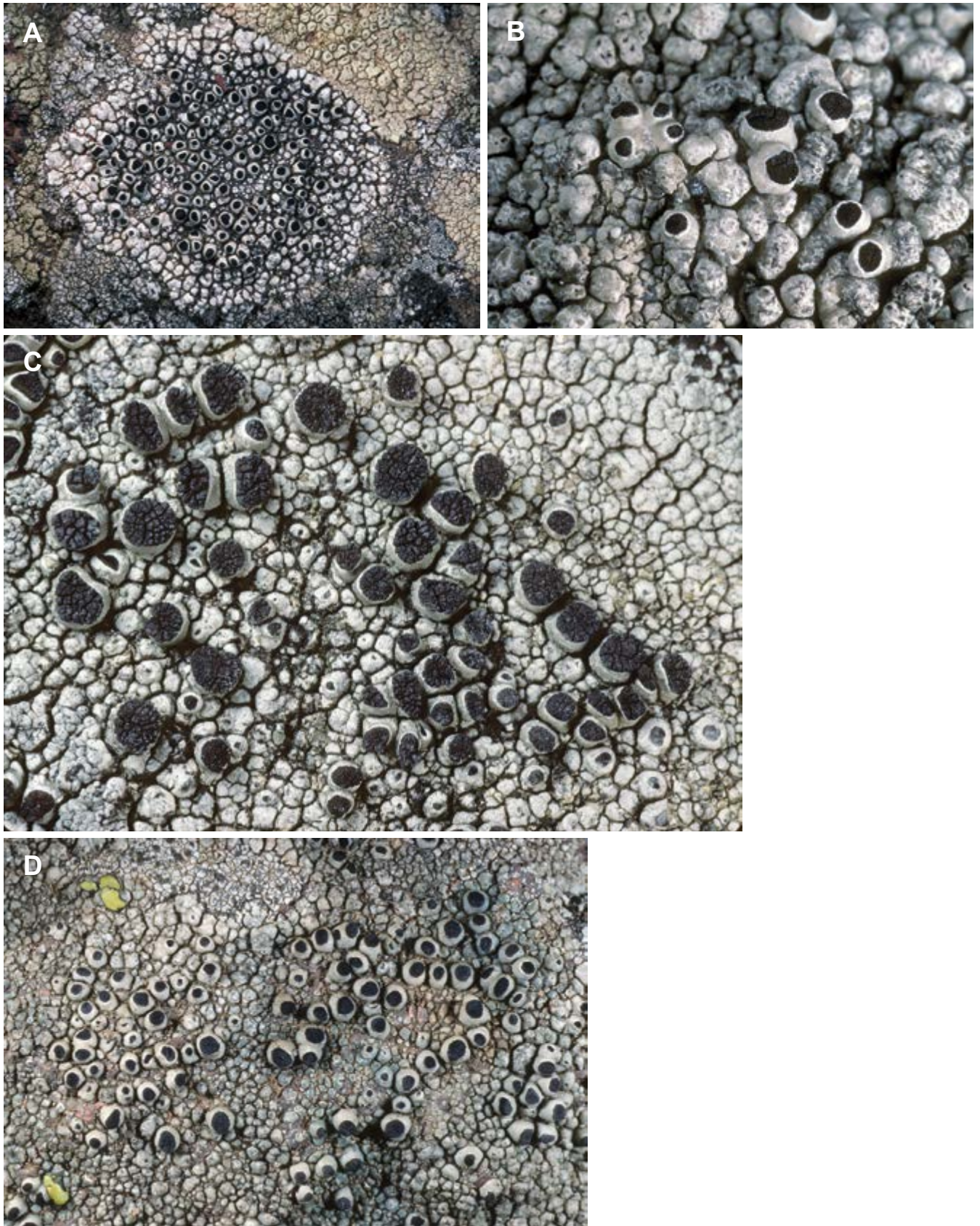


Plate 78. *Thelomma mammosum*. A. Thallus with apothecia. B–C. Apothecia sunken in thallus tissue. D. Thallus with apothecia. (A–D: Sharnoff Pers. Coll.)

Veздаea stipitata Poelt and Döbbeler

Recent synonym: none

Common name: vezdaea lichen

FIELD SUMMARY — A cryptic, immersed, crustose lichen with stalked apothecia most often found growing on moribund bryophytes and lichens. Muscicolous, lichenicolous, humicolous, terricolous.

Diagnostic characters — *Veздаea stipitata* can be distinguished by its (1) epibryophytic or lichenicolous habitat, particularly on moribund cyanolichens in the Pacific Northwest, (2) stalked apothecia, (3) apparent lack of a thallus, (4) 1-septate, smooth spores, (5) free-standing asci not imbedded in a gelatinous matrix, (6) I+ blue asci, and (7) lack of or few paraphyses.

Description

THALLUS — minute, green, crustose, immersed in thallus of host, hardly discernible except as an irregular stain on the host thallus. The genus *Veздаea* usually develops below the cuticle of bryophytes or the cortex of lichens. —soredia and isidia absent. —pycnidia absent, but conidiogenous cells have been observed in some *Veздаea* species. —photobiont green (*Leptosira*).

APOTHECIA — white, stalked or at least basally constricted, raised externally above cortices or cuticles of host species, emarginate; paraphyses rare, branched. —asci thick-walled, clavate, 8-spored. —spores hyaline, smooth, 1-septate with the two cells slightly unequal in size, (12.5) 13–15 (16) × 2.5–4 μm.

CHEMISTRY — spot tests negative.

Ecology — In Oregon, *Veздаea stipitata* is known from only two sites: a white oak, Douglas-fir wet meadow and a mixed coniferous forest containing red alder, western hemlock, western red cedar, Douglas-fir, and big leaf maple. At both localities, *V. stipitata* was collected on twigs directly above standing water at elevations below 1,500 feet. Host lichens include: *Peltigera collina* and *Nephroma bellum*. According to Coppins (1987), all British *Veздаea* grow on plant debris, moribund bryophytes, lichens, or soil in a variety of habitats. The most favored habitats include lead contaminated soils and shaded walls and rocks, on mortar on walls, or on shaded limestone. Czarnota and Kukwa (2009) report Polish sites from damp forested valleys and moist microhabitats near streams, but also from open grassland. Tschermak-Woess and Poelt (1976) suggest that *Veздаea* may be detected by searching suitable habitats in wet weather and examining bryophytes that have become discolored to a green-gray.

Distribution — *Veздаea stipitata* is known from Eurasia, Macaronesia, and North America. In western North America, *V. stipitata* is known only from Oregon where it is reported from Douglas and Lane counties within the West Cascades and Willamette Valley ecoregions.

Similar species — *Veздаea leprosa* is similar, but it has abundant paraphyses and the stalk is often hidden by the conspicuous granular thallus of soredia-like granules (referred to as goniocysts) which characterize all other known species of the genus. *Veздаea rheocarpa* is never stalked and has distinctly warted spores (20–24 × 7–11 μm). *Veздаea acicularis* spores are 7–11 septate and long acicular (60–85 × 2–2.5 μm). *Micarea* species have apothecia with proper margins and asci imbedded in a gelatinous matrix. *Fellhanera bouteillei* has apothecia with proper margins and 1-septate spores that are much more irregularly lopsided than the spores of *V. stipitata*, with one cell short and round and the other cell longer and narrower.

References — Czarnota and Kukwa (2009), Coppins (1987), Tschermak-Woess and Poelt (1976).



Plate 79. Vezdaea stipitata. A. Ascomata on Nephroma with green thallus visible. B-C. Ascomata on Nephroma substrate. (A-C: Stone Pers. Coll.)

Distribution Maps: Macrolichens



Anaptychia crinalis



Bryoria bicolor



Cetraria subalpina



Circinaria rogeri



Cladonia concinna



Cladonia poroscypha



Cladonia prolifica



Collema curtisporum



Collema quadrifidum



Collema undulatum var. *granulosum*



Dermatocarpon polyphyllizum



Ephebe solida



Fuscopannaria laceratula



Heterodermia japonica



Heterodermia sitchensis



Heterodermia speciosa



Hypogymnia pulverata



Hypogymnia subphysodes



Hypotrachyna revoluta



Hypotrachyna riparia



Leioderma soledatum



Leptogium compactum



Leptogium cyanescens



Leptogium platynum

Distribution Maps: Macrolichens



Leptogium plicatile



Leptogium siskiyouensis



Letharia gracilis



Lobaria linita



Melanelia commixta



Nephroma occultum



Niebla cephalota



Pannaria rubiginella



Pannaria rubiginosa



Peltigera cinnamomea



Peltigera hymenina



Peltula euploca



Pilophorus nigricaulis



Pseudocyphellaria hawaiiensis



Pseudocyphellaria mallota



Pseudocyphellaria rainierensis



Ramalina intermedia



Ramalina pollinaria



Solorina spongiosa



Stereocaulon spathuliferum



Sticta arctica



Sticta weigelii



Teloschistes flavicans



Tholurna dissimilis

Distribution Maps: Macrolichens



Umbilicaria hirsuta



Umbilicaria nodulospora



Umbilicaria phaea var. *coccinea*



Umbilicaria proboscidea



Umbilicaria rigida



Usnea ceratina



Usnea lambii



Usnea nidulans



Usnea rubicunda



Usnea subgracilis

Distribution Maps: Microlichens



Buellia oidalea



Calicium abietinum



Calicium adpersum



Calicium quercinum



Chaenotheca balsamconensis



Chaenothecopsis rubescens



Chaenothecopsis vainioana



Cladidium bolanderi



Gyalolechia stantonii



Lecanora caesiorubella ssp. *merrillii*



Microcalicium arenarium



Ochrolechia subplicans ssp. *subplicans*

Distribution Maps: Microlichens



Pyrrhospora quernea



Schaereria dolodes



Sclerophora amabilis



Sclerophora peronella



Sigridea californica



Texosporium sancti-jacobi



Thelenella muscorum var. *octospora*



Thelomma mammosum



Vezdaea stipitata

Abbreviations and Symbols

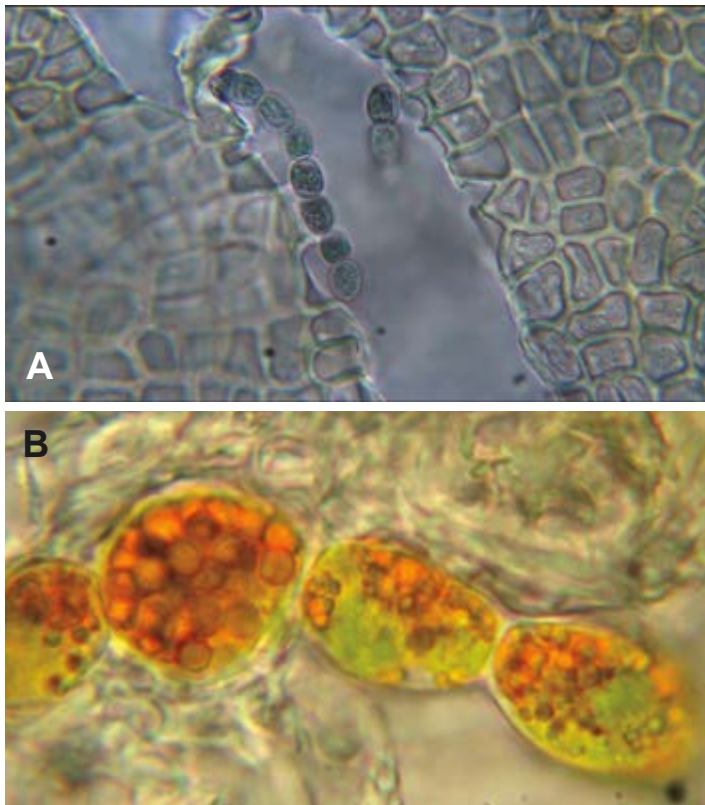
-	indicates a negative chemical reaction, no color change
+	indicates a positive chemical reaction
BLM	Bureau of Land Management
C	chemical test; commercial bleach, sodium hypochlorite
CK	chemical test; C followed by K
cm	centimeter
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
HNO ₃	nitric acid
I	chemical test; iodine solution
IKI	iodine potassium iodine
K	chemical test; potassium hydroxide
KC	chemical test; K followed by C
mm	millimeter
N	chemical test; nitric acid solution
P	chemical test; p-phenylenediamine dissolved in 95% ethanol
PNW	Pacific Northwest
SP	species
SPP	species (plural)
SSP	subspecies
µm	micrometer
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
UV	ultra-violet light
VAR	variety

Photobionts

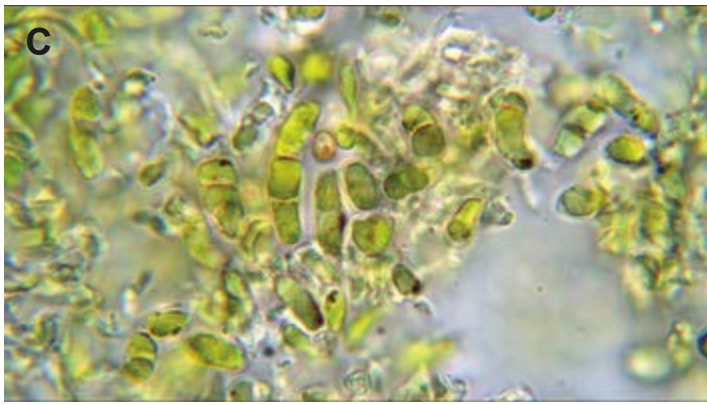
Because the photobiont is a diagnostic feature for many species in the *Caliciales*, attention must be paid to the algae associated with the thallus. Being able to identify algal species as “chlorococcoid,” *Stichococcus*, or *Trentepohlia*, is usually sufficient to enable one to work through most keys. Chlorococcoid algae, like *Trebouxia*, are unicellular and have spherical cells. Because of a “massive axial chloroplast that extends nearly to the cell wall” (Smith 1950), the cells appear more homogeneously green than do the cells of *Stichococcus*. The cells of *Stichococcus* have a distinctive darker green parietal chloroplast that encircles less than half of the cell (Smith 1950) and which contrasts with the lighter green protoplast of the rest of the cell. Also, the cells of *Stichococcus* are typically bacilliform to cylindrical and have rounded ends. They may be united into short filaments but, because of a tendency to break apart, are often unicellular. [There is another look of *Stichococcus* cells, which I’ve described as irregularly round that are often found in groups of many together.] The cells of *Trentepohlia* are spherical to oval and are united into filaments. Despite a tendency to break apart in lichenization, a careful examination will usually turn up some intact short filaments. The cells are distinguished, in many specimens, by the presence of orange betacarotene droplets. Occasionally, when these droplets are so dense as to color the entire protoplast orange, they can be confused with similarly-colored bark cells.

-Steve Selva

We include a micrograph of a *Nostoc* chain to represent a commonly encountered cyanobacteria photobiont in non-calicioid lichens. All images 100×.



Photobiont legend: A. *Nostoc* (*Leptogium*, Exeter). B. *Trentepohlia* (*Sclerophora peronella*, Exeter 2013-11).



Photobiont legend: C. *Stichococcus* (*Chaenotheca trichialis*, Exeter, 2009-5). D. *Stichococcus* with round trebouxioid cells (*Chaenotheca trichialis*, Exeter 2009-5). E. *Chlorococcales* (*Chaenotheca ferruginea*, Exeter 2012-6). F. *Dictyochloropsis* (*Chaenotheca brunneola*, Exeter, 2014-9).

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