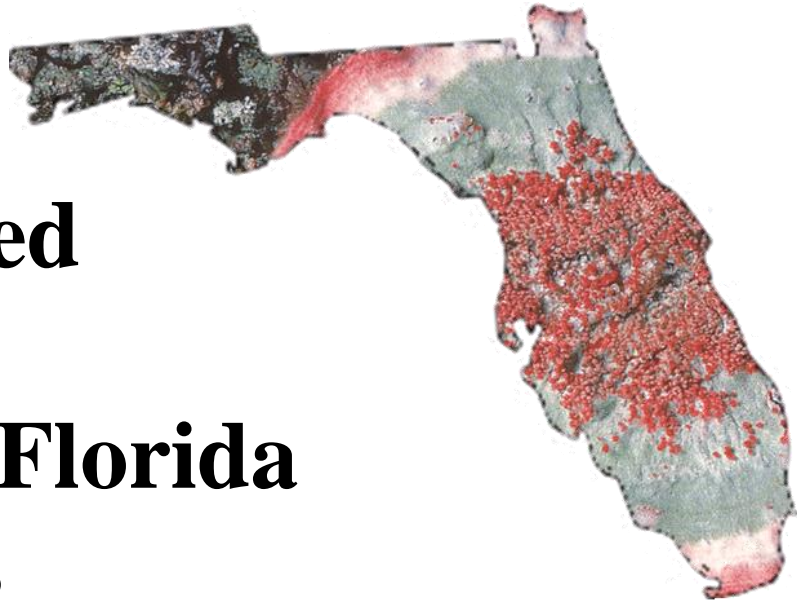


**Field
oriented
keys
to the Florida
lichens**



**Roger Rosentreter, Ann DeBolt,
& Laurel Kaminsky**

**April 2022 Version
Boise State University
University of Florida
Natural History Museum**

Field oriented keys to Florida lichens

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Introduction:

There is still much to learn about Florida macrolichens. Macrolichen diversity was first catalogued by Moore (1968), followed by Harris (1990, 1995). "Lichens of North America" also contains photographs and descriptions of many of Florida's macrolichens (Brodo et al. 2001). The aim of this online publication is to compliment these other resources and provide more field oriented keys to the macrolichen diversity. We hope to encourage the incorporation of lichens into field oriented ecological studies.

Many of the species included in the keys are based on lists and information from Harris (1990, 1995), as well as our own surveys in Florida. Information was also compiled from Moore (1968), Brodo et al. (2001) and from unpublished research at Everglades National Park (Seavey - personal communication). The keys and their format are modified from Rosentreter and DeBolt 2015 (open source online published keys).

Moore (1968) documented many different lichen distributional ranges in Florida, and provided excellent insight into lichen diversity. We have divided Florida into three geographic regions: (1) the Florida Panhandle, (2) North Central Florida (Lake Okeechobee north to Jacksonville), and (3) the Everglades region (Lake Okeechobee south to the Florida Keys). The field work and basis for this key is mostly north-central Florida, though some field work has been conducted in the other regions. Observations on collections were based on herbarium collections and by field work of Roger Rosentreter, Ann DeBolt, and Laurel Kaminsky.

These keys will work for typical material. Notes on observed differences and ranges of traits in species will be mentioned. It will take some time to recognize the differences between species and variation within a species.

Records of lichens from North America are being placed online at the Consortium of North American Lichen Herbaria (CNALH) <https://lichenportal.org/cnalh/>. We encourage you to utilize this website to map the range of species and for more information on distribution.

Field oriented keys to the Florida lichens: online.

http://www.flmnh.ufl.edu/herbarium/lib/pdf/Rosentreter_Field_oriented_keys_to_the_Florida_lichens_April_2022.pdf.

These keys are focused on the macrolichens. A few easily distinguished crustose genera included.

Introductory Key

- 1) Thallus fruticose... **Key 1**
- 1) Thallus foliose... 2

- 2) Thallus yellow or orange... **Key 2**
- 2) Thallus green, gray, brown, or black... **Key 3**

Key 1- Fruticose

- 1) Thallus yellow to orange... *Teloschistes exilis*
 - 1) Thallus some shade of green, or reddish in one *Usnea* species... 2

 - 2) Thallus composed of squamules and podetia, thallus hollow. Usually growing on sand, or decomposing wood, rarely found on small fallen litter... *Cladonia*
 - 2) Thallus erect or pendant or hairlike, growing on live bark, common on fallen litter... 3

 - 3) Thallus hairlike, green, with yellow to orange to brown apothecia... *Coenogonium* (not treated)
 - 3) Thallus erect or pendant, apothecia green... 4

 - 4) Usually pendant (1 statewide common shrubby species), thallus with a central cord, with a solid axis that is hollow or solid... *Usnea*
 - 4) Usually shrubby (2 southern Florida pendant species), thallus without a central cord, always solid... *Ramalina*
-

Key 2: Some shade of yellow or orange:

- 1) Lobes larger, less adhered to the bark. Apothecia large, brown, known from the Panhandle..... *Vulpicida viridis*
 - 1) Lobes smaller, tightly adhered to the bark. Apothecia small, orange, throughout Florida..... *Candelaria concolor*
-

Key 3: Some shade of green to gray/green:

Key applies to thallus color when **dry**

- 1) Thallus a shade of brown, olive, black, or bluish gray... 2
- 1) Thallus a shade of green to gray and white, not dark... 11

- 2) Lower side with yellow or white spots (with pseudocyphellae or cyphellae) ... 3
- 2) Lower side without yellow or white spots (lacking pseudocyphellae or cyphellae)... 4

- 3) Lower side with white spots (cyphellae), never with yellow spots (pseudocyphellae)... *Sticta*
- 3) Lower side not with white spots (cyphellae), with yellow spots (pseudocyphellae)...
Pseudocyphellaria aurata

- 4) Lower side with veins, veins broad and light to dark brown in color, lower side white between veins, along rivers that flood seasonally, known from 3 locations in Florida... *Peltigera polydactylon*
- 4) Lower side without veins, lower side color various... 5
- 5) Lobes small, under 3 mm... **Physciaceae Key**
- 5) Lobes large, above 3 mm... 6
- 6) Lower side tomentose, with clumps of rhizines; upper cortex olive to brown color, apothecia or lobules present, no soredia or isidia present... *Lobaria*
- 6) Lower side not tomentose, upper cortex various colors, soredia or isidia present... 7
- 7) Thallus brown with large flat brown apothecia on lower side and/or flattened isidia on upper cortex... 8
- 7) Thallus brown, black, olive or blue gray, without large flat brown apothecia on lower side or without flattened isidia... 9
- 8) Lower surface not tomentose, with large flat brown apothecia on lower side and flattened isidia on upper surface... *Nephroma helveticum*
- 8) Tomentose lower surface, without large flat brown apothecia on lower side, with flattened isidia on upper surface... *Lobaria tenuis*
- 9) Gelatinous, jelly-like when wet, non-stratified thallus... *Leptogium/Collema/Physma* (see key under *Leptogium*)
- 9) Not gelatinous or jelly-like when wet, stratified thallus..... 10
- 10) Apothecia red with white rim (lecanorine), isidia never present... *Pannaria/and related genera*
- 10) Apothecia tan to brown, lacking a white rim or isidia present..... *Coccocarpia*
- 11) Tomentose lower side, clumps of rhizines; pale underside; red apothecia or marginal lobules present..... **Lobaria**
- 11) Not tomentose, rhizines present or not; red apothecia not present; lobules not present... 12
- 12) With cilia (true cilia, not rhizines)... 13
- 12) Without cilia..... 14
- 13) Lobes wider than longer... **Parmeliaceae Key**
- 13) Lobes longer than wider... **Physciaceae Key** (*Heterodermia*)
- 14) On sandstone, one location in Florida... *Xanthoparmelia conspersa*
- 14) On bark, or moss, never on rock..... 15
- 15) Upper cortex with white dots (pseudocyphellae)..... *Punctelia rudecta*
- 15) Upper cortex without white dots (pseudocyphellae)..... 16

- 16) Lower cortex with yellow spots (pseudocyphellae)... *Pseudocyphellaria aurata*
- 16) Lower cortex without yellow spots.....17

- 17) With apothecia.....18
- 17) Without apothecia, soredia, isidia or no reproductive structures.....19

- 18) With brown apothecia, or brown at margins of apothecia... **Parmeliaceae Key**
- 18) With black apothecia, or gray or white coated (pruina) on apothecia... **Physciaceae Key**

- 19) Thallus surface texture cottony..... *Crocynia*
- 19) Thallus surface texture continuous and smooth or cracked..... 20

- 20) Thallus circular, small, <5mm and aqua blue colored... *Normandina pulchella*
- 20) Thallus various but not circular, small and bluish..... 21

- 21) With isidia..... 22
- 21) Without isidia... 24

- 22) Lower cortex orange..... **Physciaceae Key** (*Heterodermia*)
- 22) Lower cortex color various, not orange..... 23

- 23) Almost crustose to adnate foliose..... **Physciaceae Key**
- 23) Foliose..... **Parmeliaceae Key**

- 24) Almost crustose to very adnate foliose; thallus color white to gray, to gray green...
Physciaceae Key
- 24) Leafier foliose; thallus color yellow green to green..... **Parmeliaceae Key**

Parmeliaceae Key:

- 1) Cilia present, large and easily seen..... 2
- 1) Cilia not present, or small and inconspicuous (appearing rhizine-like) ... 4

- 2) Cilia without a bulbate (swollen) base, lobes large 4-20 mm wide, thallus often with large cracks, common throughout Florida..... *Parmotrema*
- 2) Cilia with a bulbate (swollen) base..... 3

- 3) Cortex gray, common from Lake Okeechobee north... *Bulbothrix*
- 3) Cortex yellow, two species in Florida, rare, known from the Florida Keys and the Florida Panhandle in old growth forests... *Relicina*

- 4) With apothecia, soredia and isidia absent5
- 4) Without apothecia, soredia and isidia present... 9

- 5) Lobes large 4-20 mm wide..... *Parmotrema*
- 5) Lobes small 0.5-6.0 mm wide..... 6

- 6) Rhizines dichotomously branched..... *Hypotrachyna*
6) Rhizines simple or not dichotomously branched.....7
- 7) Medulla bright yellow..... *Vulpicida viridis*
7) Medulla pale yellow near algal layer or white... 8
- 8) Thallus green, gray to green brown, apothecia with toothed margins, with white pseudocyphellae along thallus margin, all spot tests negative...*Tuckermannopsis fendleri*
8) Thallus yellowish green, apothecia without toothed margins, without white pseudocyphellae along margins, Cortex KC+ orange... *Pseudoparmelia*
- 9) Lobes large 4-20mm wide... *Parmotrema*
9) Lobes small 0.5-6.0 mm wide... 10
- 10) Underside black, thick and spongy like due to thick rhizines, known from Escambia County only, rare and probably restricted to Florida Panhandle, marginally isidiate... *Anzia ornata*
10) Underside pale to black, not thick and spongy like, rhizines present but not very thick... 11
- 11) Cortex yellow green, pustulate, pustules break down to form coarse soredia; lowerside white... *Parmeliopsis subambigua*
11) Cortex gray green, soredia and isidia various; lowerside various... 12
- 12) Rhizines dichotomously branched..... *Hypotrachyna*
12) Rhizines not dichotomously branched...3
- 13) Soredia coming from pustules, medulla faintly yellow usually below soredia... *Myelochroa aurulenta*
13) Soredia and isidia various, not coming from pustules... 14 (*Parmelinopsis*, *Canoparmelia*, *Imshaugia*)
- 14) Medulla C+ red or pink, or at least (KC+ red); underside black, sorediate.. *Parmelinopsis*
14) Medulla C-; underside various, rarely entirely black, sorediate or not... 15
- 15) Lobes 1-2 mm wide, thallus K+ dark yellow, isidiate, often resembling *Physcia* sp., rare in FL..... *Imshaugia aleurites*
15) Lobes 3-5 mm wide, thallus K+ light yellow, isidiate or sorediate, not resembling *Physcia* sp., common..... *Canoparmelia*

Physciaceae Key

- 1) Isidia present... 2
1) Isidia not present... 3
- 2) Lower surface black, lacking rhizines..... *Dirinaria papillulifera*
2) Lower surface tan, with unbranched rhizines... *Imshaugia aleurites* (in Parmeliaceae, but resembles Physciaceae)

3) Cilia or rhizines resembling cilia present, lobes longer than wide, lobes appear to flow towards lobe tips, Lobes small (0.5-2 mm wide), lower cortex yellow or purple or lower cortex not present in some species... ***Heterodermia***

3) Cilia not present... 4

4) Rhizines lacking... 5

4) Rhizines present... 6

5) Underside black, lobes separable from the substrate, more adnate, rosette shaped thallus, lobes elongate and laterally confluent..... ***Dirinaria***

5) Underside pale to black, lobes entirely adnate to the substrate, less adnate and not rosette forming, lobes not confluent..... ***Hyperphyscia***

6) Cortex UV+ yellow or UV- and/or apothecia black, lacking a thalline margin and/or medulla white, yellow, orange to salmon colored..... ***Pyxine***

6) Lichen not as above... 7

7) White lower surface, cortex K+ yellow... ***Physcia***

7) Black lower surface, cortex K-... ***Phaeophyscia/Physciella***

Bulbothrix (Loop Lichen, Eyelash Lichen)

Description: Foliose. Lobes medium, closely attached to the bark, edges adnate but not attached. Gray-green colored upper surface color. Medulla white. Lower surface brown or black. Apothecia or isidia present, occasionally branched; never sorediate. Ciliate, **with the base of the cilia bulbate or swollen**. Rhizines present, unbranched or forked. Spot tests various. Unique feature(s): **The lobes are often rounded and make little circular shapes between lobes in the lobe sinus**. The lobes are similar to *Parmelinopsis*, but the latter does not have bulbate cilia. *Relicina* spp. also has bulbate cilia but is very rare in Florida and has a yellowish cortex. This genus is UV-.

Range: In Florida, south to Lake Okeechobee. In southeast U.S., mostly Coastal Plain, on bark, especially *Pinus*.

Notes: *B. isidiza* and *B. scortella* (formerly *B. goebelii*) are the most common species in Florida.

Sources: Brodo et al. 2001; Hale 1976; Harris (1990, 1995); Benatti & Elix 2012.

Key:

1) Thallus not isidiate, apothecia present, medulla C+ red (lecanoric acid)...***B. confederata***
Smooth eyelash lichen

1) Thallus isidiate, isidia often confined to a small portion or lobe of the thallus, apothecia absent, C+ red or pink, K- or K+ red 2

2) Lower side and rhizines black, rhizines present and abundant, medulla C+ red, K-....
..... ***B. laevigatula*** Matted eyelash lichen

2) Lower side and rhizines beige to brown, rhizines present, not abundant, medulla C+ pink or K+ red 3



B. confederata Both photos: Sharnoff

B. laevigatula

3) Medulla K+ red, C-, throughout Florida ***B. isidiza*** Salted eyelash lichen

3) Medulla K-, C+ rose to red, KC+rose, UV- northern Florida.. ***B. scortella***
Rough eyelash lichen

(*B. scortella* was formerly called *B. goebelli*, due to a mis-typification of the species. *B. goebelli* is NIS, and is not known from North America).



B. isidiza Photo: Sharnoff



B. scortella Photo: Pamela Hess
close-up of bulbate cilia

Candelaria (Candleflame Lichen)

Candelaria concolor

Description: Foliose. Lobes small, closely attached to the bark, edges adnate but not entirely attached. Yellow colored upper surface. Medulla white. Lower surface white to pale brownish, corticate. Soredia present; apothecia rare. Spot tests: Thallus, all negative. Unique features: **One of the few yellow foliose lichens in Florida.**

Range: North of Lake Okeechobee.

Notes: Often found on orange trees in orchards, or in nitrogen rich environments. Only one species is known from Florida, *Candelaria concolor*. Common near dairy operations and dusty secondary roads.

Sources: Brodo et al. 2001



Candelaria concolor Photo: Sharnoff

Canoparmelia (Cloud Lichen)

Description: Foliose. Lobes medium, closely attached to the bark, edges adnate but not attached. Pale greenish gray to yellowish upper surface. Apothecia rare. Soredia or isidia present.

Maculate or not maculate. Non-ciliate. Rhizines unbranched. Spot tests various. Unique features: **Lobes are cloud-like or ruffled** with a certain amount of 3-D texture in the lobes.

Range: Throughout Florida. *C. martinicana* is only known from the Florida Keys and Everglades, *C. amazonica* (proposed as a *Parmelinella* now - Rodrigues et. al. 2021) and *C. cryptochlorophaea* are found throughout FL, while the other species (*C. caroliniana*, *C. salacifera*, and *C. texana*) are restricted to north of Lake Okeechobee.

Notes: On bark, often on conifers. Not included in the key is *C. martinicana*, a tropical lichen, which is PD+, K-, and isidiate (photo below).

Sources: Brodo et al. 2001; Harris 1990, 1995. Lendemer & Ruiz 2015. Rosentreter & DeBolt 2020. Rosentreter et al. 2020. Rodrigues et al. 2021.

Key:

1) Thallus isidiate... 2

1) Thallus sorediate... 4

2) Thallus not maculate, medulla UV-, K+ red or K-, KC+ pink... 3

2) Thallus maculate, medulla UV+ blue white, K-, KC-.... *C. caroliniana*

Carolina cloud lichen



C. caroliniana Photo: Schumm



C. martinicana Photo: Jason Hollinger

3) Lower surface jet black, maculate, medulla K-, KC+ pink.. *C. amazonica*

Florida cloud lichen

3) Lower surface brown, medulla K+ yel to R, KC-, rare .. *C. salacinifera*

Salted cloud lichen



C. amazonica Both photos: Pamela Hess

C. salacinifera

4) Soredia on raised lobes, KC+ purple, K+y-red, common ... *C. cryptochlorophaea*

Powdered cloud lichen

4) Soredia not on raised lobes, laminal, KC+ pinkish, infrequent *C. texana*

Texas cloud lichen



C. cryptochlorophaea

Photo: Troy McMullin

C. texana <http://www.tropicallichens.net/1851.html>

Table # 1. Comparison Table for the Florida *Canoparmelia*. Ap= apothecia, S=soredia, I=isidia, n=no, y=yes, ls=lower surface, br=brown, bl=black, mac=maculate, M=Medulla, color reactions: no= --, b=bluish, w=white p=pink, pur=purplish, Y=yellow, R=red, O=orange.

Species	Ap	S	I	ls	mac	M PD	M K	M KC	M UV	notes
<i>amazonica</i>	n	n	y	jet bl	--	R	--	pink	--	isidia not as dense, lobes more separated
<i>caroliniana</i>	n	n	y	med - dark br, or br - bl, br margin	lobe tips	--	--	-- or pur	b-w	isidia simple, very fragile
<i>crozalsiana</i>	n	y	n	bl middle R-ish br margin	--	O	Y	--	--	similar to <i>C. texana</i> , different chemistry
<i>cryptochloro-phaea</i>	n	y	n	br	--	--	dark pink	pur	dull b	soralia on erect lobes on thallus
<i>salacinifera</i>	n	n	y	br	--	Y	R	--	--	K+ y to R
<i>texana</i>	n	y	n	bl middle R-ish br margin	--	--	--	-- or pur	b-w	laminal soredia, pollution tolerant
<i>martinicana</i>	y	n	y	bl	lobe tips	O	Y	Y	--	tropical; only in the Everglades

Chrysothrix (Gold Dust Lichen)

Description: Powdery (leprose) yellow to green lichens consisting of mostly soredia. They are generally on wood or organic matter or even rock. *Chrysothrix* prefers sites sheltered from direct rainfall. Its color can be quite radiant.

Range: This genus grows throughout Florida.


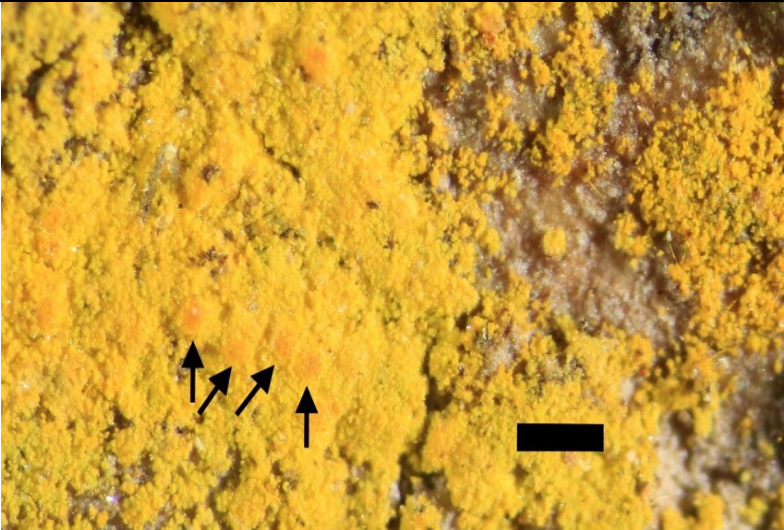
Notes: The species can't be distinguished in the field; they require TLC tests.

Sources: Lendemer and Elix 2010;

LaGreca, S. 2020. *Chrysothrix bergeri* (Ascomycota: Arthoniales: Chrysothricaceae), a new lichen species from the southeastern United States, the Caribbean, and Bermuda. *Plant and Fungal Systematics* 65: 509–514.

1a. K+, K- slowly reddish, unreliable K test2
 1b. K-, UV-, granules similar in size as below, ascospores with a medial constriction, bright yellow, TLC, pinastric acid only, bright yellow, on wood ***C. xanthina*** Gold dust

2. TLC, calycin, small granule size (15–)20–45(–60) µm across (averages 30–37.5 µm), ascospores 3-septate with no medial constrictions and sometimes with one pointed end, typically bright yellow, often on *Quercus* ... ***C. bergeri*** Berger's gold dust

	
<p><i>C. xanthina</i> on wood of old <i>Pinus</i> trunk Photo: Jason Hollinger</p>	<p><i>C. bergeri</i> arrows show the apothecia Photo: Scott LaGreca, used with permission; scale bar is 250 µm</p>

Other uncommon species of *Chrysothrix* in Florida include:
Chrysothrix insulizans

Cladonia

Description: Consisting of **two parts, squamulose primary thallus, and an erect fruticose structure called podetia**. Squamules small to medium. Podetia small to large. Pale greenish gray to white to yellowish upper surface. Apothecia or soredia present. Never isidiate. Apothecia brown, tan or red. Spot tests various. Unique features: **Sometimes intricately webbed** as in *C. evansii*.

Range: Throughout Florida. Some species have strong habitat preferences.

Notes: On wood, sand, or soil. Tables of key characteristics are presented for each group of species for easy comparison.

Sources: Brodo et al. 2001; Harris 1990, 1995; DeBolt et al. 2007; Rosentreter & DeBolt 2020, DeBolt 2021.

Key:

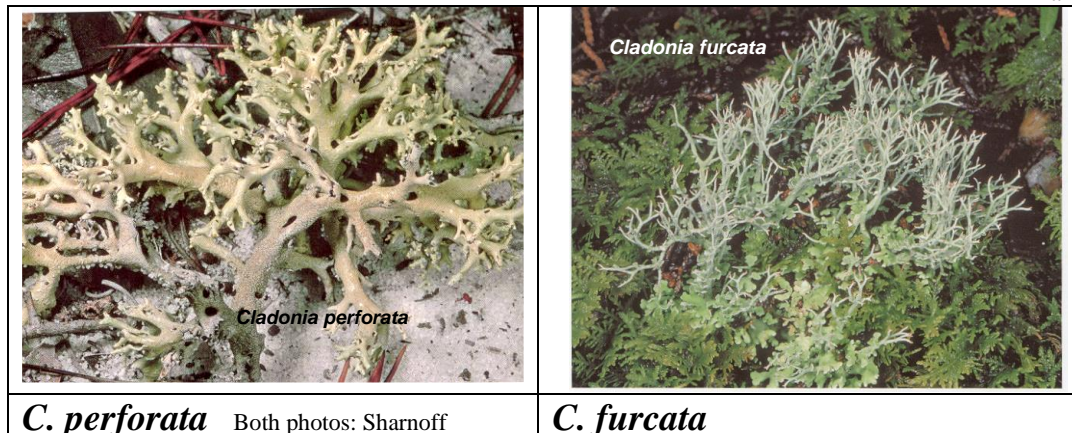
- 1a. Podetia intricately branched, generally more than 5x; the branch tips pointed; primary squamules usually lacking.....**Key 1**
- 1b. Podetia simple or sparingly branched, primary squamules usually present... **2**
 - 2a. Apothecia red.....**Key 2**
 - 2b. Apothecia tan, brown or lacking..... **3**
 - 3a. Podetia lacking, apothecia lacking...***C. prostrata*** Cigarette ash lichen
 - 3b. Podetia present..... **4**
 - 4a. Podetia forming definite cups..... **Key 3**
 - 4b. Podetia not forming definite cups..... **Key 4**

Key 1

Podetia intricately branched. Primary squamules usually lacking.

- 1a. Cortex well developed, podetia often appearing glossy.....**2**
 - 2a. Podetia coarse, perforate, on white sugar sand ..***C. perforata*** Perforate lichen
 - 2b. Podetia coarse or fine but not perforate.....**3**
 - 3a. Podetia PD+.....**4**
 - 4a. Podetia with squamules, especially near the base, PD+ red (fumarprotocetraric acid), various habitats ***C. furcata***

Many-forked Cladonia



- 4b. Podetia not squamulose, PD+ yellow.....**5**

5a. Podetia thin, fine and hair-like, apothecia lacking; greener colored than *C. pachycladodes*, and less densely branched than *C. subtenuis*, surface smooth, on white sugar sand, uncommon.....

C. subsetacea Spaghetti lichen



C. subsetacea Photo: DeBolt



C. leporina Photo: Sharnoff

5b. Podetia coarse, usually tipped with red apothecia; lacking in some populations (Palm Beach County), thallus yellow green, surface rugose, very common ***C. leporina*** Jester lichen

3b. Podetia PD-, colonies are slightly flattened rather than erect.

6a. Podetia gray-white-cream, thick, cortex fuzzy, infrequent, in white sand, more adnate to embedded in the soil, K-..... ***C. pachycladodes***
Lazy Cladonia

6b. Podetia greenish, with whitish tips, thin walls, tips gradually narrowing and turn downward. surface rough and bumpy in the older parts of the thallus, lobe tips forked and pointed, more slender and shiny than *C. pachycladodes* K-, KC+yel ***C. dimorphoclada*** Prostrate thorn Cladonia



C. pachycladodes Both photos: Sharnoff



C. pachycladodes note surface roughness



C. dimorphoclada Photo: DeBolt



C. dimorphoclada Photo: Sharnoff
close-up



C. perforata, pachycladodes, subsetacea from upper left, to lower left, to right, both photos: A. DeBolt



C. perforata, prostrata, evansii, pachycladodes, leporina



C. pachycladodes, subsetacea, perforata
From left to right Both photos: DeBolt



C. perforata, subsetacea



Comparison photo of several *Cladonia* species R. Rosentreter #20,876

- 1b.** Cortex poorly developed, podetia usually appearing dull and fibrous
 - 7a.** Podetia usually white or gray-white but sometimes tinged with yellow-green toward the apex, PD-; forming compact globose colonies ... *C. evansii* Syn.: *Cladina evansii*
Powder-puff lichen, Deer moss
 - 7b.** Podetia gray-white or yellow-green, PD+ red; forming loose subglobose or irregular colonies.....**8**
 - 8a.** Podetia generally yellow-green, occasionally gray, K-; common...
...*C. subtenuis* K+ Dixie deer lichen
 - 8b.** Podetia gray, K+ yellow (atranorin); rare.....**9**



C. evansii Both photos: Sharnoff

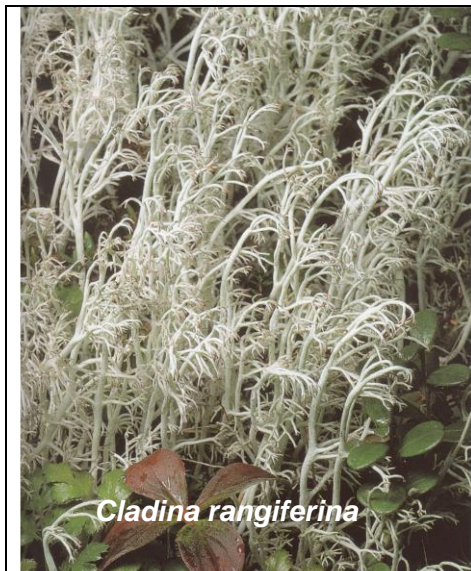


C. subtenuis

9a. Most branches terminate in whorls; on sand in north Florida.... *C.*

rangiferina Syn.: *Cladina rangiferina* Gray reindeer lichen

9b. Most branches terminate in dichotomies; on limestone in the Everglades and sandy habitats across the state, less densely branched than *C. subtenuis*, not yellowish, lacking usnic acid, K+ yellow ... *C. sandstedei* K+ Dixie deer lichen



C. rangiferina Photo: Sharnoff



C. sandstedei Photo: Pamela Hess

Table 1. Characteristics of species in Key 1. Podetia Intricately Branched

Y= yellow, R= red

Taxa	Common Name	Podetia/ thallus color	Apothecia	Chemistry		Habitat/ Substrate
				K	PD	
<i>evansii</i>	powder-puff lichen, deer moss	rounded, 3-6 cm white gray	--	K+ Y	PD-	Sand/wood
<i>dimorphoclada</i>	prostrate thorn cladonia	thin, tips gradually narrowing and forked turned downward, whitish green	brown	K-, KC+Y	PD-	White Sand
<i>furcata</i>	many-forked cladonia	funnels & squamules present, pale green	brown	K-	PD+ R	Shady soil wood
<i>leporina</i>	jester lichen	curved tips, bright yel-green	red	K+ Y	PD+ Y	Sand/soil/wood
<i>pachycladodes</i>	lazy cladonia	bent tips, 25-50 mm gray whitish	yel-brown	K-	PD+ Y	White sand
<i>perforata</i>	perforate cladonia	pale green/white, 20-60 mm, shiny	--	K-	PD-	White sand
<i>rangiferina</i>	gray reindeer moss	white-silver, gray	--	K+ pale Y	PD+ R	Sand/soil
<i>sandstedei</i>	K+ Dixie deer lichen	pale yellow-green, dichotomous, slender	--	K+ Y	PD+ R	Sand/soil
<i>subsetacea</i>	spaghetti cladonia	delicate in lax, tangled, recumbent colonies, yel-green	--	K-	PD+ Y or R	White sand
<i>subtenuis</i>	Dixie deer lichen	pale yel-green, dichotomous, slender	--	K-	PD+ R	Sand/soil

Key 2

Podetia simple or sparingly branched. Primary squamules usually present. Apothecia red.

1a. Basal squamules usually lacking, podetia much branched, yel-green, usnic acid present, very common ***C. leporina*** Jester lichen



- 1b. Basal squamules present, podetia simple or sparingly branched.....2
 - 2a. Basal squamules granulate, often dissolving into sorediate masses; **gray** colored thallus; didymic acid present, **usnic acid lacking**, podetia sorediate, common on wood..... *C. ravenelii* Ravenel's cup lichen
 - 2b. Basal squamules not granulate..... 3
- 3a. Basal squamules at least partially sorediate.....4
 - 4a. Podetia corticated, non-sorediate, not darkening; usnic acid present, green colored, common.. *C. incrassata* Powder-foot British soldiers





C. ravenelii Both photos: Sharnoff



C. incrassata

- 4b. Podetia partially non-corticate.....5
 - 5a. Podetia nearly all sorediate (farinose); primary squamules with marginal soredia, green, contains usnic acid. *C. macilenta* Lipstick lichen

5b. Podetia sorediate on the lower half, primary squamules rounded, limited soredia or soredia lacking, grey-colored, lacking usnic acid... *C. floerkeana* Gritty British soldiers

 <p><i>Cladonia macilenta</i></p>	 <p><i>Cladonia floerkeana</i></p>
<p><i>C. macilenta</i> Both photos: Sharnoff</p>	<p><i>C. floerkeana</i></p>

3b. Basal squamules esorediate.....6

6a. Surface of podetia K+, PD+.....7

7a. Basal squamules large, streaked with yellow below, often on the base of old trees or snags.... *C. hypoxantha* Yellow-bellied Cladonia

7b. Basal squamules smaller, not streaked with yellow below.... 8

8a. Podetia densely squamulose, partially ecorticate, darkening ... *C. didyma* var. *vulcanica*
Southern soldiers

8b. Podetia rarely squamulose, completely corticate and not darkening; on *Taxodium* (cypress) and wood..... *C. abbreviatula* Short Cladonia

	 <p><i>Cladonia didyma</i> var. <i>vulcanica</i></p>	<p>No photo</p>
<p><i>C. hypoxantha</i> Photo: Pamela Hess</p>	<p><i>C. didyma</i> var. <i>vulcanica</i> Photo: Sharnoff</p>	<p><i>C. abbreviatula</i></p>

6b. Surface of podetia K-, PD-.....9

9a. Podetia partially ecorticate, **sorediate**, ecorticate areas darkening; common in areas of dense vegetation

C. didyma Southern soldiers

9b. Podetia completely corticated, esorediate, not darkening; on wood, rare *C. cristatella* British soldiers

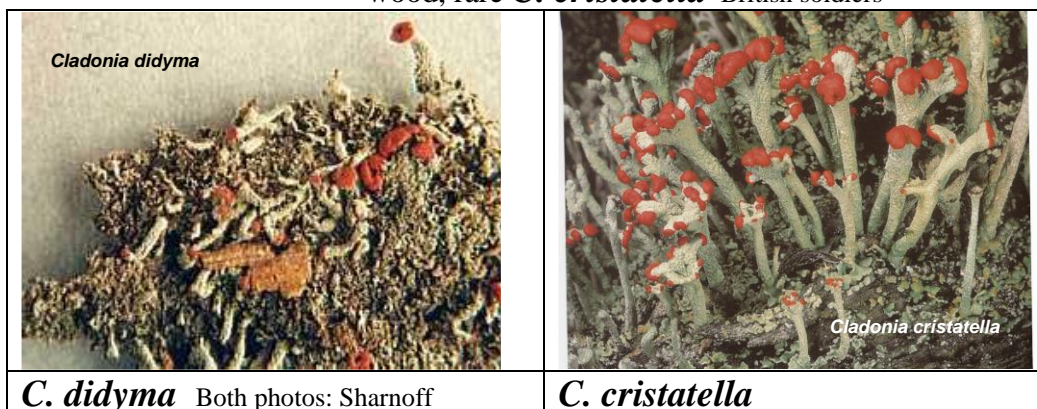


Table 2. Characteristics of species in Key 2. Podetia Sparingly Branched, Apothecia Red.

Y= yellow, R= red, O= orange

Taxa	Common Name	Podetia	Sorediate	Chemistry		Habitat/ Substrate
				K	PD	
<i>abbreviatula</i>	short cladonia	Yellow-green, short, turbinate, UV+	No	K+ Y	PD+ deep Y	Wood
<i>cristatella</i>	British soldiers	Unbranched (or at tips), yel-green, cups absent, <25mm	No	K-	PD-	Wood
<i>didyma</i>	southern soldiers	Unbranched, green, gray, 10-30 mm	Yes	K-	PD-	Wood
<i>didyma</i> var. <i>vulcanica</i>	southern soldiers	Unbranched, green, gray, 10-30 mm	Yes	K+ Y	PD+ O	Wood
<i>floerkeana</i>	gritty British soldiers	Unbranched, small, green-gray, 5-20 mm, cups absent	No/Yes on the margins	K-	PD-	Wood
<i>hypoxantha</i>	yellow striped cladonia	Poorly developed, yellow band on lower side of squamules	Yes, on the margins	K+ Y	PD+ deep Y	Woody base of trees
<i>incrassata</i>	powder-foot British soldiers	Unbranched, 8 mm, usnic acid, green	Yes	K-	PD-	Wood
<i>leporina</i>	jester lichen	Branched (curved tips), yell-green	No	K+ Y	PD+ Y	Sand/soil/wood
<i>macilenta</i>	lipstick lichen	Unbranched, slender gray-green, 10-30 mm, cups absent	Yes	K-	PD-	Wood/soil
<i>ravenelii</i>	Ravenel's cup lichen	Well developed, gray colored	No, appear as large granules but not soredia	K+ Y	PD+ deep Y	Wood

Key 3a

Cladonia prostrata

Podetia rarely developed; basal squamules large, to 4 mm long, loosely attached to the substrate and curling up at the edges, on sand, common ***C. prostrata***
 Cigarette ash lichen, Resurrection lichen

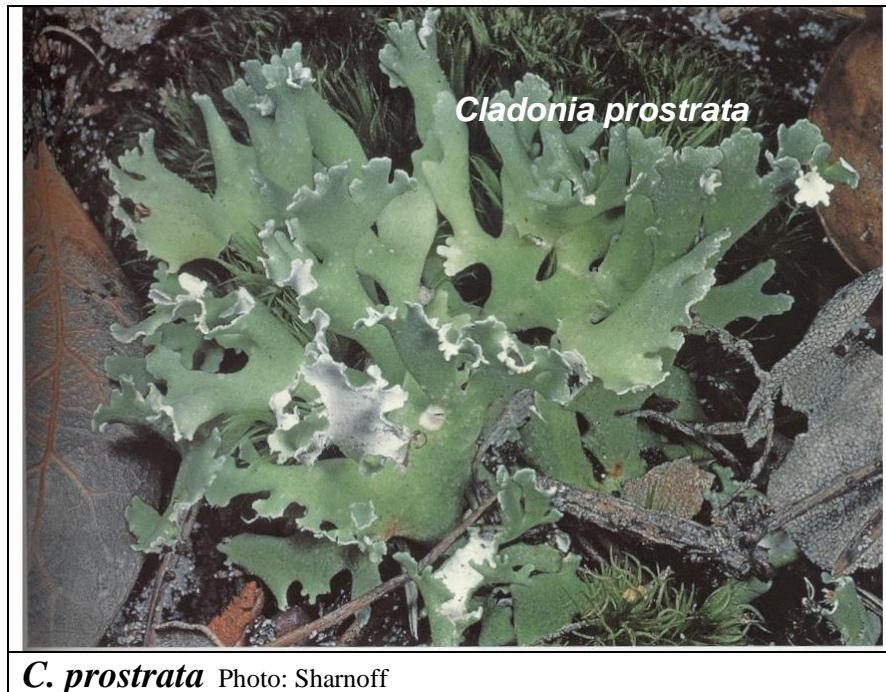


Table 3. Characteristics of *Cladonia prostrata*.

Y= yellow, R= red

Taxa	Common Name	Podetia	Sorediate	Apothecia	Chemistry		Habitat/ Substrate
					K	PD	
<i>prostrata</i>	resurrection lichen	Lacking or stubby	No	Lacking	K+ Y	PD+ R	Sand

Key 3b

Podetia simple or sparingly branched. Primary squamules usually present. Apothecia tan, brown, forming recognizable cups.

1a. Cups proliferating either marginally or from the center**2**

2a. No soredia, podetia PD+ yellow, squamules are loosely attached to the soil and can be large and leafy, on wood, or soil ... ***C. rappii*** Slender ladder lichen

2b. Sorediate, podetia PD+ red or red-orange, on organic matter or wood, cups often narrow, small, shallow, very common ***C. subradiata***

Syn: *C. balfourii*, Powdery subradiata



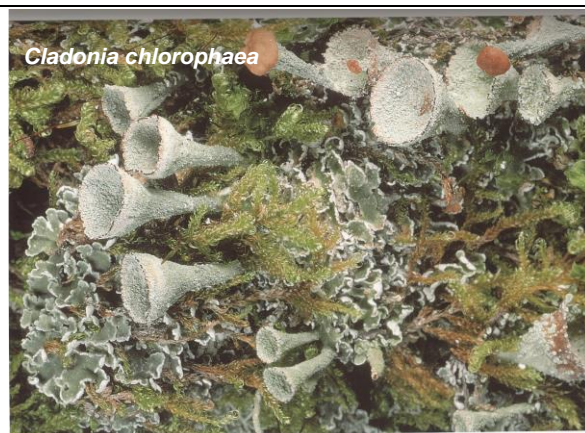
C. rappii Both photos: Sharnoff

C. subradiata

1b. Cups not proliferating**3**

3a. Podetia PD+ or PD-, grayanic acid present; rare in north Florida.....***C. grayi***
Grayanic acid pixie-cup

3b. Podetia PD+, grayanic acid lacking; sporadic throughout the state.....
C. chlorophaea Mealy pixie-cup



C. grayi Photo: Jason Hollinger

C. chlorophaea Photo: Sharnoff

Table 3 b. Characteristics of species in Key 3. Single and Sparingly Branched, Apothecia Tan or Brown, with Recognizable Cups. Y= yellow, R= red, Br= brown

Taxa	Podetia	Cups	Sorediate	Apothecia	Medulla K	Medulla PD	Habitat/ substrate
<i>chlorophaea</i>	Br-green, 35mm	Simple, terminal	Yes	--	K-	PD+ R	Wood/ or soil
<i>grayi</i>	Gray green Broad cups	Simple, terminal	Yes	Tan, uncommon	K-	PD-	Wood
<i>rappii</i>	Gray-green, 15-40mm,	Multiple cups along podetia	No	Dark Br	K-	PD+ Y	Sand/soil
<i>subradiata</i>	Cylindrical, 10-20mm	Simple, terminal	Yes	Dark Br, small	K-	PD+ Y	Wood/ organic matter

Key 4

Podetia simple or sparingly branched. Primary squamules usually present. Apothecia tan, brown; not forming recognizable cups.

1a. Podetia sorediate.....**2**

2a. Basal squamules granulose-sorediate on underside of the squamules, much divided; podetia PD+, K+, on wood, podetial often lacking***C. parasitica***

Fence-rail Cladonia

2b. Basal squamules esorediate, rounded; podetia PD+, K-.....**3**

3a. Podetia ecorticate except at the very base; when sterile, terminating in a flat top, most common and widespread sorediate species with podetia

.....***C. subradiata*** Syn.: *C. balfourii*; Powdery subradiata



C. parasitica Both photos: Sharnoff

C. subradiata

3b. Podetia at least partially corticated; base of podetia sorediate, PD+red, when sterile, blunt at the apex, mostly found on soil.....

.....***C. ramulosa*** syn *C. pitryea*



C. ramulosa Photo: Sharnoff



C. ramulosa Photo: Jason Hollinger

- 1b. Podetia esorediate..... 4
- 4a. Podetia K+.....5
- 5a. Podetia branched, PD+ yellow or yellow-orange (thamnolic acid)6
- 6a. Podetia irregularly branched, appearing flattened, coarsely areolate cortex, mostly squamules *C. santensis*
- 6b. Podetia branching to form corymbose clusters, finely areolate cortex.....
-*C. floridana* Bramble Cladonia



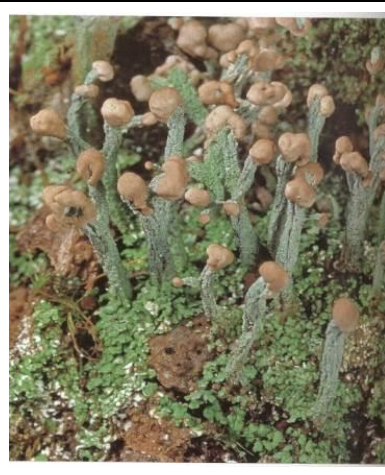
C. santensis
Both photos: Jason Hollinger



C. santensis close-up



Cladonia floridana



C. peziziformis

C. floridana Both photos: Sharnoff

5b. Podetia usually unbranched, **large leafy** squamules recurved and lobed, apothecia not much wider than the podetia, PD+ red or yellow; atranorin present or absent, stictic and norstictic acid generally present; K+yel, or K- ... ***C. subcariosa*** Syn.: *C. polycarpia*; *C. polycarpoides* Peg lichen

4b. Podetia K- 7

7a. Podetia PD- or reaction not determinable 8

8a. Podetia completely corticated, areolate, directly on soil or sand, common early successional species, basal squamules rounded and shell-like, apothecia one continuous cap at the top, apothecia generally wider than the podetial stalk, apothecia paler brown than *C. subcariosa*, variable in size but generally > 5mm tall

C. peziziformis Syn.: *C. leptothallina* Turban lichen



C. subcariosa Both photos: Jason Hollinger
on ground; K+y-r

C. subcariosa on ground; K+y-r

8b. Podetia mostly ecorticate *C. botryocarpa* Grape lichen



C. botryocarpa Photo: Pamela Hess

7b. Podetia PD+..... 9

9a. Podetia PD+ yellow, fruit pale brown to dark brown often on *Taxodium*, in the Panhandle, check the chemistry for *C. buckii*, squamatic acid, UV+ ... *C. beaumontii* Funnel lichen



C. beaumontii Both photos: Jason Hollinger (close-up)



C. beaumontii

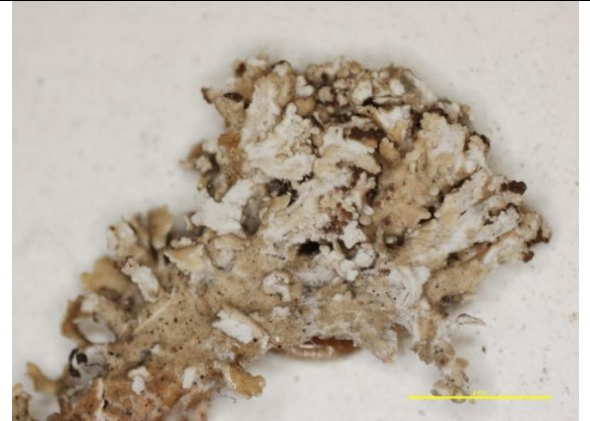
9b. Podetia PD+ red..... 10

10a. Podetia appearing twisted or torn, usually less than 1 cm tall, common early successional species Pd+yel or red ... *C. peziziformis* Syn.: *C. capitata* Turban lichen

10b. Podetia not appearing twisted or torn, to 2.5 cm tall, squamules lobed Pd+red
 *C. simulata* Branched turban lichen



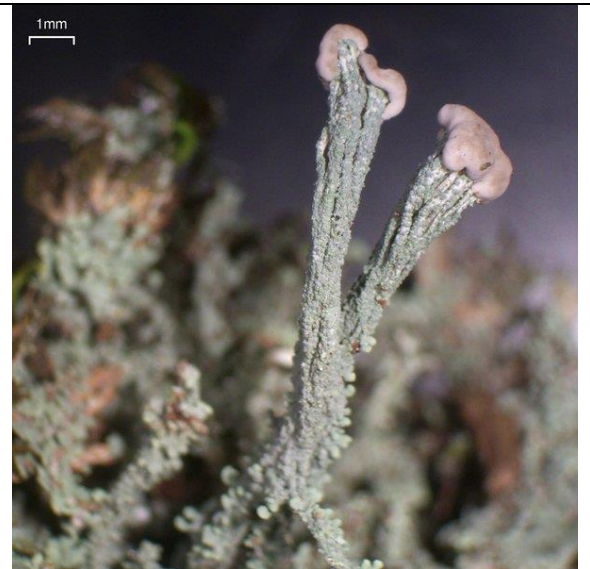
C. beaumontii Photo: Sharnoff



C. simulata Photo: Consortium C.A. Robbins



C. peziziformis note shell-like squamules
 Both photos: Jason Hollinger



C. peziziformis

Table 4. Characteristics of Species in Key 3. Single and Sparingly Branched, Apothecia Tan Brown, without Cups. Y= yellow, R= red, O= orange; Br= brown

Taxa	Common Name	Podetia	Soredia present	Apothecia	Chemistry		Habitat/
					K	PD	Substrate
<i>beaumontii</i>	funnel lichen	Gray green, with squamules	No	Pale Br to Br	K-	PD+ Y UV-	Wood
<i>botryocarpa</i>	grape lichen	Simple, decorticate <5mm	No	Br Several balls on the tip	K- KC+	PD-	Soil/wood
<i>floridana</i>	bramble cladonia	Branched, slender, 25 mm, pale green, gray	No	Br	K+ deep Y	PD+ O	Soil
<i>parasitica</i>	fence-rail lichen	Sparse or absent, 3-10 mm,	Yes	Pale R-Br	K+ deep Y	PD+ O	Wood
<i>peziziformis</i>	turban lichen	Unbranched, slender, 10-20mm	No	Br, large wider than the podetia	K-	PD+ R Or Y	Soil
<i>ramulosa</i>	---	Blunt tipped sorediate base	Yes	Br	K-	PD+ R	Soil
<i>santensis</i>	----	Short, rarely branched	No	--	K+ Y	PD+ Y to O	Wood
<i>simulata</i>	branched turban lichen	Branched, poorly developed cups	No	Br	K-	PD+ R	Wood/soil
<i>subcariosa</i>	peg lichen	Unbranched, broad at top; 10-30mm	No	Br in cluster not wider than the podetia	K+ Y, R or K-	PD+ Y to Y	Wood/soil
<i>subradiata</i>	powdery subradiata	Cylindrical, 10-20mm	Yes	Dark Br, small	K-	PD+ R	Wood/organic matter

Additional uncommon or rare *Cladonia* species in Florida:

C. cinerella - Only known from a few populations in Everglades National Park. This species is probably confined to tropical hammocks in southern Florida. It is common in the Caribbean islands. It has atranorin as a major chemical compound (K+red).

C. nana - Rare in North America, known from Everglades National Park, and a few state parks in Florida.

Coccocarpia (Shell Lichen)

Description: Foliose. Lobes medium or small, closely attached to the bark, edges adnate but not attached. **Pale blue-gray upper surface.** White medulla. Isidia present, never soreciate. Apothecia often present, brown to black. Rhizines present, unbranched often thick. Spot tests negative, no chemicals. Unique feature(s): The larger species *C. erthroxyli* and *C. palmicola* can be distinguished by the thick bluish thallus. The small lobe species (under 2 mm) are the only small gray to **blue color** species of any genera in Florida. Other blue-colored genera in Florida include *Pannaria* and some species of *Leptogium*. *Pannaria* species in Florida have apothecia and have a thick thalline margin around the apothecia, while *Coccocarpia* species have a thin thalline margin around the apothecia or lack a thalline margin.

Range: *C. domingensis*, *C. erthroxyli* and *C. palmicola* are found throughout Florida. The ranges of the other species are poorly known and are not well collected to determine their range.

Notes: On bark or on other lichens, mostly hardwood bark. The lobe size of *C. palmicola* and *C. erythroxyli* may be variable depending on location and habitat. North American collections are treated as wide lobed (2-7 mm wide). Smaller lobed species may be under reported in North America due to small size or restricted habitat requirements. *Coccocarpia filiformis* resembles *Polychidium dendriscum*, but differs in the spores (*Coccocarpia* is 1 celled, *Polychidium* 2)

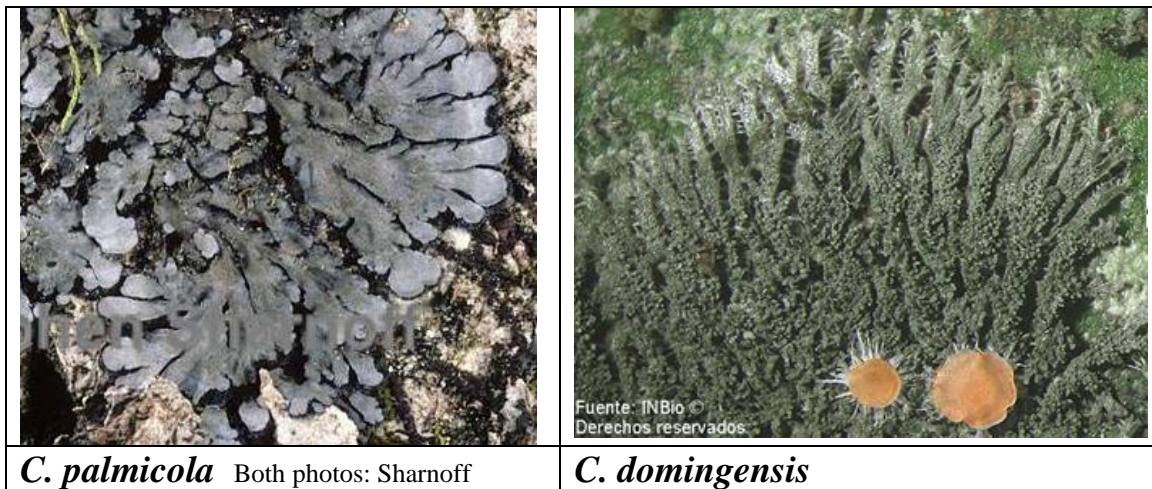
Sources: Brodo et al. 2001; Arvidsson 1982, Lücking et al. 2007; Kaminsky et al. 2013

1) Isidia present, apothecia absent or rare... 2

1) Isidia absent, apothecia present, or not... 4

2) Lobes large (2-5 (-12) mm wide), lacking secondary branching lobes wider than longer, common throughout Florida ... *C. palmicola* Salted shell lichen

2) Lobes small (0.2 -2 mm wide), longer than wider, with secondary branching lobes... 3



3) All lobes flat, never curved, lobes never ascending or descending, isidia cylindrical to flattened, throughout Florida *C. domingensis* Blue shell lichen

3) Primary lobes flat, secondary branching lobes curved ascending or descending, isidia flattened on margins (lobules). Most common in central Florida ***C. prostrata***
 Prostrate shell lichen

4) Lobes large (2-7 (-12) mm wide), wider than long, common throughout Florida.

..... ***C. erythroxyli*** Fruiting shell lichen

4) Lobes small (0.2 -2 mm wide), longer than wide..... 5



C. prostrata Both photos: Jason Hollinger

C. prostrata



C. erythroxyli Photo: Sharnoff

C. erythroxyli Photo Jason Hollinger

5) Thallus not minutely fruticose, flat, lobes 0.2 – 0.5 mm wide, uncommon in Florida.

..... ***C. stellata*** Star-shaped shell lichen

5) Thallus minutely fruticose, lobes under 0.1 mm wide, lobes slightly rounded, known from north-central Florida to the Panhandle; in the past it was misidentified as *Polychidium dendriscum* ***C. filiformis*** Blue thread shell lichen



C. filiformis Photo: Pamela Hess



C. stellata

Coenogonium (Pixie-hair Lichen)

Description:

Filamentous lichen usually forming light orange to pale green cottony tufts 10-30 mm across, coalescing into small shelf-like colonies in a few species. Each hair-like element of the thallus consists of a filament of the green algae *Trentepohlia*, enveloped in a network of fungal hyphae. Apothecia biatorine, yellow to pale orange, slightly stalked in some species disks usually flat, with thin, persistent margins, paraphyses unbranched, spores 1-2 celled, colorless, ellipsoid, 8 spores per ascus in either a single row or two irregular rows. Chemistry: no known lichen substances.

Range: Poorly known but probably throughout the state.

Notes: Probably more common than it is known.

Sources: Brodo et al. 2001; Lucking et al. 2011; Plata et al. 2006.

Only one common species in Florida, *Coenogonium implexum* Pixie-hair



C. implexum Photo: Sharnoff



C. implexum Photo: Jason Hollinger close-up

There are other species known, but they are uncommon; mostly in south Florida. Photos and the key to the species of *Coenogonium* of the world is in Lucking et al. 2011 (*Coenogonium congensense*, *geralense*, *linkii*, *luteocitrinum*, *luteum*, *subdentatum*, *subfallaciosum*).

Crocynia (Cotton Lichen)

Description: Crustose lichen with a **thick, cottony**, bluish gray thallus. It often appears foliose, with distinct adnate lobes. Light green to bluish-gray color upper surface, **upper cortex ecorticate**. Lobe margins, 0.4-1.3 mm wide, black hypothallus present. Often soresiate in older parts of thallus; apothecia rare to lacking and isidia lacking. Photobiont green. Chemistry: Thallus PD+ orange, K+yellow, KC-, C-, atranorin, stictic acid, triterpenes, and fatty acids. Unique feature(s): Looks like a *Lepraria* but has a black hypothallus.

Range: Throughout Florida

Notes: Two species are known from the state: *C. gossypina*, lacks stictic acid, while *C. pyxinoides* has stictic acid (K+ yellow, PD+ orange). Syn=*Phyllospora*.

Sources: Brodo et al. 2001

Key:

- 1) With stictic acid, Medulla K+ yel... *C. pyxinoides* Cotton lichen
- 1) Without stictic acid, Medulla K-... *C. gossypina* Cotton lichen



Crocynia pyxinoides K+
Both photos: Sharnoff



C. gossypina K-

Dirinaria (Medallion Lichen)

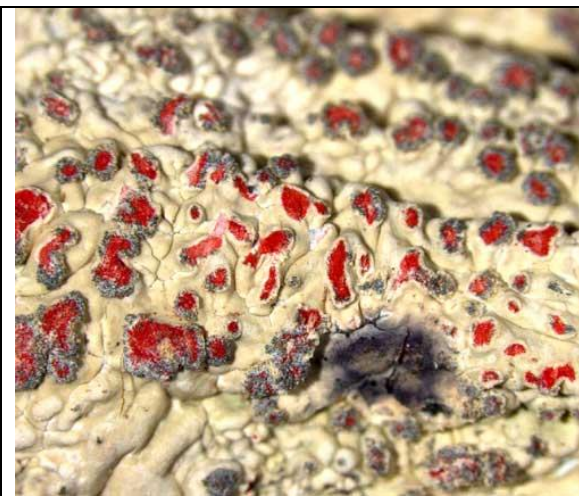
Description: Foliose. Lobes small (1-4 mm wide), closely attached to bark. Pale gray or greenish upper surface. Medulla white. Soredia, isidia or apothecia present. **Rhizines not present, or sparse.** Spot tests negative except for two species that are UV+ blue or white. Unique feature(s): **Lobes have a wavy texture to the surface.** Thallus lobes become **fused together into a continuous thallus** more so than the genus *Pyxine*. Apothecia with a greenish rim. The thallus looks like a coin, or medallion, **melted** onto the twig or bark of the tree.

Range: Common, throughout Florida. *D. leopoldii* is uncommon but may be more widespread.

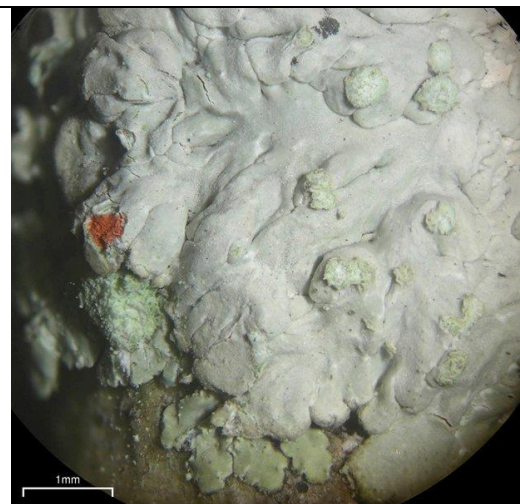
Notes: *D. leopoldii* is the only macrolichen with a red medulla in Florida.

Sources: Brodo et al. 2001; Harris 1995; Lucking et al. 2011, Rosentreter & DeBolt 2020.

- 1) Medulla red..... *D. leopoldii* Leopold medallion lichen
- 1) Medulla white..... 2



D. leopoldii http://www.seaveyfieldguides.com/Lichens/photo_pgs_d/dirinaria_leopoldii2.html



D. leopoldii Photo: Jason Hollinger on dead *Taxodium* twig

- 2) With apothecia, not sorediate or isidiate..... 3
- 2) Without apothecia, sorediate or isidiate..... 5
- 3) Apothecia purple to slightly purple/black, usually abundant... *D. purpurascens*
.....Purple-eyed medallion lichen
- 3) Apothecia not purplish, most black, difficult to determine in the field..... 4



D. purpurascens

Both photos: Jason Hollinger

D. purpurascens

- 4) Medulla UV+ white, sekikaic acid, spores 5-8 uu.... ***D. confusa*** UV+ White medallion lichen
 4) Medulla UV+ blue, divaricatic acid, spores >8 uu.... ***D. confluens*** Wavy medallion lichen



D. confusa Photo: Jason Hollinger

D. confluens Photo: Sharnoff

- 5) Isidia to isidiate pustulate, soredia absent 6
 5) Isidia not present, soredia present, throughout Florida..... 7
 6) True isidia, known from Okeechobee and Citrus counties, and south of Lake Okeechobee
 ***D. papillulifera*** Isidiate medallion lichen

6) Isidiate pustulate..... *D. aegialita* Grainy medallion lichen



D. papillulifera



D. aegialita Both photos: Pamela Hess

7) Lobes plane, not confluent, irregularly branched; apices truncate; throughout Florida, UV+ blue, common *D. picta* Powdery medallion lichen

7) Lobes often convex, confluent; apices flabellate; generally, slightly larger lobes; throughout Florida, UV+ blue, common *D. applanata* Confluence medallion lichen



D. picta Both photos: Sharnoff



D. applanata

Flakea

Description: *Flakea papillata*: Squamulose to small foliose lobes. Lobes blue green. Surface micro-papillate. Often found on rock in other states, but prefers bark and soil substrates in Florida. This habitat specificity appears to break down in Florida, where thalli are also found on bark and soil.

Range: In humid sites throughout Florida, but not well collected, to possibly rare.

Notes: Blue-green color and small squamules.

Sources: Perlmutter 2006.

Gary B. Perlmutter 2006. *Flakea papillata* in North America. *The Bryologist* 109(4): 566-569.



F. papillata Photo: Gary Perlmutter #1267 habitat on rock



F. papillata Photo: Sharnoff

Heterodermia (Fringe Lichen)

Description: Foliose. Lobes small to large, center of lobes attached to bark. Edges of lobes free or adnate. **Pale gray upper surface, to whitish.** White medulla. Soredia, isidia or apothecia present. **Lower side white, orange, or purplish gray in some species.** White cilia present in a few species. Cilia are pale rhizines. Spot tests various, K+ yellow, or orange, most species KC-, C-. Unique feature(s): Lobes appear to radiate out from center of thallus. **No lower cortex in some species.**

Range: Throughout Florida, although many species reported only from north of Lake Okeechobee, while *H. albicans*, *H. pseudospeciosa* and *H. barbifera* reported throughout the state, including south of Lake Okeechobee.

Sources: Brodo et al. 2001; Harris 1995; Lendemer et al. 2007; Lendemer 2009

Key:

1) Thallus lobes ascending or descending, not adnate to bark, appearing fruticose, north Florida, all rare..... *H. leucomela*, *H. echinata*, and *H. barbifera* (syn=*H. podocarpa*)

These uncommon species need further taxonomic study in Florida (Lendemer 2009); see the *Heterodermia* comparison chart for determinations. There are also norstictic acid (Med K+red) chemotypes and acid deficient chemotypes. See Lendemer 2009 for the current concepts on these chemotypes and names for chemical species.

		
<p><i>H. leucomela</i> Photo: Sharnoff</p>	<p><i>H. echinata</i> Photo: Jason Hollinger</p>	<p><i>H. barbifera</i> Photo: Felix Schumm</p>

- 1) Thallus adnate to bark, lobes not ascending 2
- 2) Thallus with laminal isidia, isidioid-soredia or minute marginal phyllidia/lobules11
- 2) Thallus sorediate, soralia marginal or terminal, but not only laminal.....3
- 3) Underside ecorticate..... 4
- 3) Underside corticate..... 9
- 4) Underside evenly pigmented orange; underside K+ purple, granular sorediate at the lobe tips, North of Lake Okeechobee ***H. obscurata*** Orange-bellied fringe lichen

4) Underside not pigmented, or sparsely pigmented orange or yellow, or entirely pigmented yellow or purple, underside K-..... 5

5) Underside with small patches of orange pigment only on the lobe tips, K+ .. ***H. neglecta***

5) Underside not pigmented or pigmented yellow, K-, 6



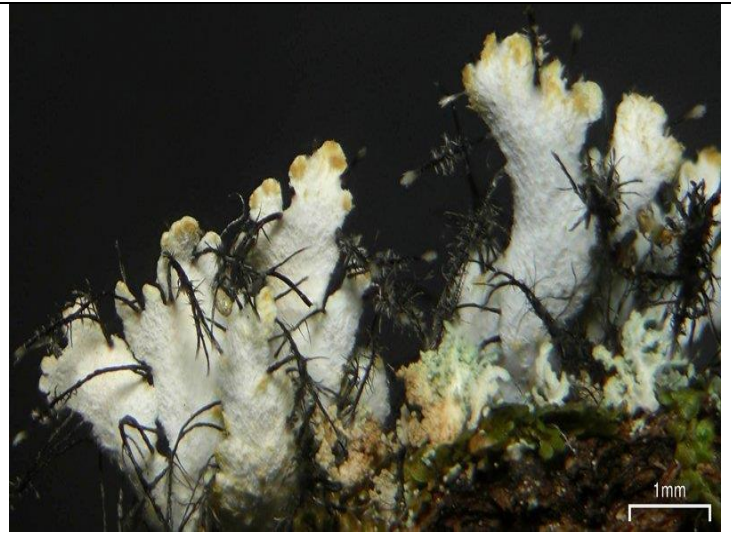
H. obscurata Photo: Sharnoff
sorediate upper side, underside orange



H. neglecta Photo: Jason Hollinger
a little orange on lobe tips



H. neglecta Photo: Felix Schumm



H. neglecta Photo: Jason Hollinger
on branch of scrubby *Quercus*; underside

6) Yellow to orange pigmented thalli, surface K+yel, 7

6) Underside not pigmented yel/orange, or yel/orange and K- 8

7) Yellow pigment sparse, confined to the underside of the lobe tips or lacking, soredia fine on the underside of the lobe tips and marginally, surface K+ yel ... *H. japonica*

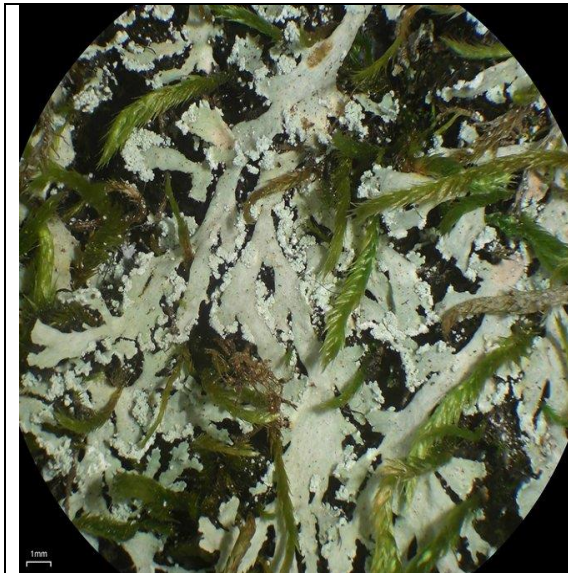
7) Yellow pigment central and spreading towards the thallus margins, but not confined to the lobe tips, soredia coarse marginal and irregularly laminal on older central portions of the thallus, surface K+yel, Med K+yel—red, Lendemer says this species **does not occur in Florida** and those specimens called *H. casarettiana* are *H. japonica* {*H. casarettiana*}



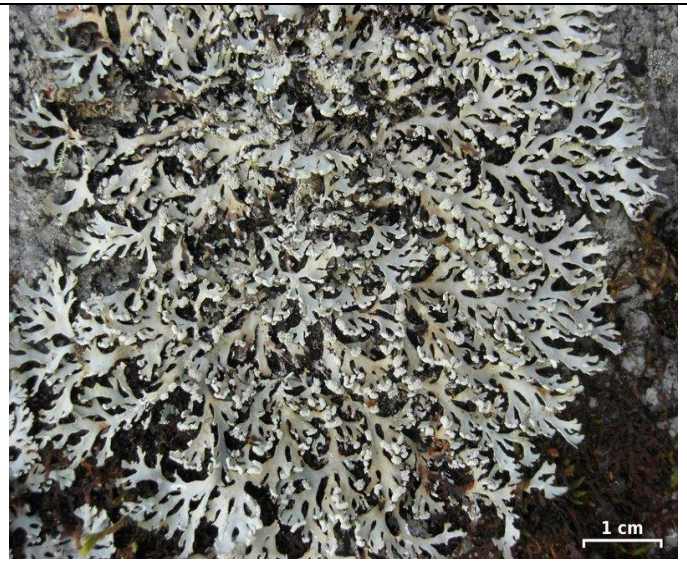
H. japonica Photo: Felix Schumm



H. casarettiana Photo: Jason Hollinger



H. japonica Both photos: Jason Hollinger



H. casarettiana

8) Rhizines thyriform (with many side branches, not squarrose), **pale**, soredia fine and terminal *H. galactophylla* Pale rhizined fringe lichen

8) Rhizines squarrose (with a few side branches), **dark**, soredia fine on the underside of the lobe tips and marginally *H. japonica* Japanese fringe lichen

- 9) Medulla K-, soredia coarse marginal on the lower surface of the margins, and on specialized lobe tips near the central portion of the thallus, mostly corticolous *H. speciosa*
 9) Medulla K+ yel → red 10



H. galactophylla Photo: Felix Schumm



H. speciosa Photo: Jason Hollinger

- 10) under surface white 11
 10) under surface yellow to brownish 12

11) **Common** in Florida, thallus large, medulla K+ yel → dull red (salazinic acid), KC-, soredia along lobe margins and edges, more adnate than most of the other species.....

H. albicans White fringe lichen

11) Rare (may not be present in Florida), thallus small, medulla K+ yel → red (norstictic acid), surface K+yel, mostly saxicolous..... *H. pseudospeciosa*



H. albicans Both photos: Sharnoff

H. pseudospeciosa

12) Underside pigmented orange (pigment K+ purple), medulla K-, or K+ yel (lacking salazinic acid), isidia laminal and marginal, cylindrical but often abraded, to isidioid soredia

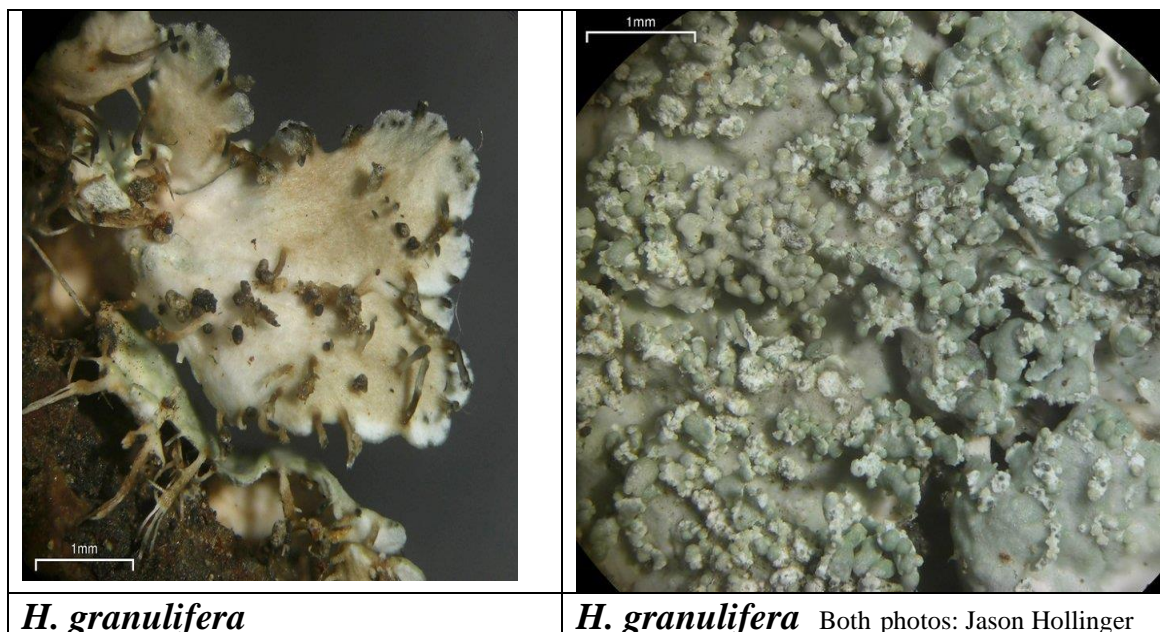
..... ***H. crocea***

12) Underside not orange, medulla K+ yel → dull red (salazinic acid), short granulose isidia, often pruinose ***H. granulifera***



H. crocea Photo: Pamela Hess
note orange underside

H. crocea Photo: Jason Hollinger



H. granulifera

H. granulifera Both photos: Jason Hollinger

Comparison chart of *Heterodermia* species in or reported from Florida. (NIS= no isidia or soredia)

Species	Lobes	Lower surface	Lower surface color	Lower surface K test	Soredia/isidia	Additional distinct characteristics
<i>albicans</i>	Adnate	Corticate	White	NA	Soredia	Med K+ yellow to dull red
<i>barbifera</i>	Ascending	Ecorticate	White	NA	Soredia	Rhizines branched
<i>casarettiana</i>	Adnate	Ecorticate	Yellow	-	Soredia	Rhizines squarrose; med K+ red
<i>crocea</i>	Adnate	Ecorticate	Entirely orange	K+purple, med K+yel	Isidia	NA
<i>echinata</i>	Ascending	Ecorticate	White	NA	NIS	Rhizines simple
<i>galactophylla</i>	Adnate	Ecorticate	White	-	Soredia	Rhizines thyrs-like, pale
<i>japonica</i>	Adnate	Ecorticate	White/yel lobe tips	-	Soredia	Rhizines squarrose, medulla K-
<i>granulifera</i>	Adnate	Corticate	Pale to light yel-brown centrally	med K+yel-dull red	Isidia	Granular isidia
<i>leucomela</i>	Ascending	Ecorticate	White	NA	Soredia	Lobes long, pendant, strap-like
<i>neglecta</i>	Adnate	Ecorticate	Sparsely orange	K+purple	Soredia	NA
<i>obscurata</i>	Adnate	Ecorticate	Entirely orange	K+purple	Soredia	NA
<i>pseudospeciosa</i>	Adnate	Corticate	White	NA	Soredia	Med K+ yellow to orange
<i>speciosa</i>	Adnate	Corticate	White	NA	Soredia	Medulla K+ yellow

Hyperphyscia (Shadow-crust Lichen)

Description: Foliose. Lobes very small (0.5-2 mm wide), tightly adnate to the bark. Upper surface brown-gray to gray. Medulla white or orange (in older sections of lobes). Lower surface pale to black. Apothecia or soredia present, never isidiate. Rhizines sparse to lacking. Cortex: no substances, medulla K-, or K+ purple (if medulla orange). Unique features: This is the **smallest lobed** genera in the state. *Phaeophyscia* spp., which are similar in size to *Hyperphyscia* spp., are usually **less closely attached to the substrate**. Black hypothallus present in 1 species (*H. minor*).

Range: Throughout Florida. *H. pyrithrocardia* is the most common species, and *H. adglutinata* is a rare species, known from only two locations near Tampa, FL.

Notes: Four species are known from Florida. Due to their small size, they are often overlooked. The genus was recently revised (Esslinger et al. 2012), and *H. pyrithrocardia* was described as new to North America. These small lobed species may be under reported in North America due to small size or restricted habitat requirements.

Sources: Harris 1995; Esslinger et al. 2012.

Key: (Modified from Esslinger et al. 2012.)

- 1) Medulla orange (skyrin- K+ purple) throughout the thallus (sometimes) faint or missing in youngest lobes), at least the lower part of the medulla.. *H. pyrithrocardia*
Orange shadow-crust lichen
- 1) Medulla white (very rarely with trace orange pigments) 2
- 2) Thallus with apothecia, not sorediate *H. syncolla* Fruiting shadow-crust lichen
- 2) Soredia present, apothecia absent..... 3



H. pyrithrocardia Photo: Scott LaGreca



H. syncolla Photo: Sharnoff

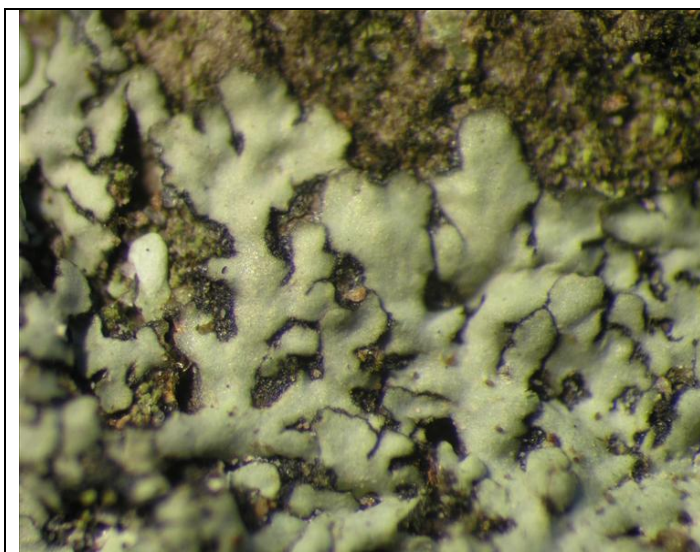


H. syncolla Both photos: Rosentreter

H. minor note soralia

3) Thallus with a black lower surface, black hypothallus usually present..... *H. minor*
Shadow-crust lichen

3) Thallus with a pale or only slightly darkened lower surface, hypothallus absent, rare in Florida
..... *H. adglutinata* Grainy shadow-crust lichen



H. minor Both photos: Sharnoff (close-up)

H. adglutinata

Hypotrachyna (Loop Lichen)

Description: Foliose. Lobes small to medium, closely attached to bark except for the edges. Upper surface gray to greenish yellow. White medulla, lower surface very black. Apothecia or soredia present, never isidiate. Spot tests various. **Thallus UV+ yellow or no color change.** Unique features: **Rhizines dichotomously branched and abundant, lobe apex rounded.**

Range: South to Lake Okeechobee in Florida.

Notes: Small lobed specimens can be confused with *Pyxine* or *Dirinaria*. These latter species are more adnate to the substrate, even on the edges.

Sources: Harris 1995, Brodo et al. 2001.

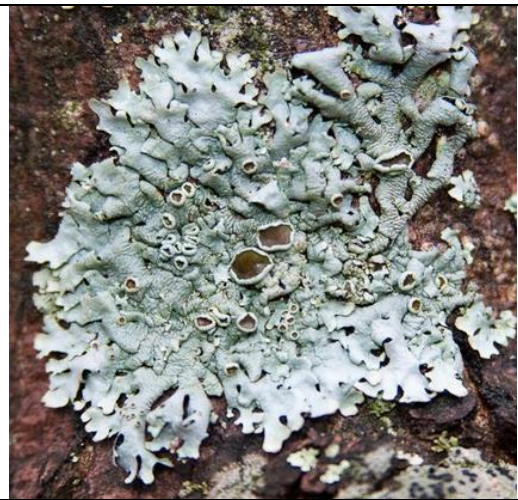
1) Thallus sorediate, apothecia not present.....2

1) Thallus not sorediate, apothecia common, margins are folded inward with age, UV-.....

Hypotrachyna livida Wrinkled loop lichen



H. livida Photo: Sharnoff

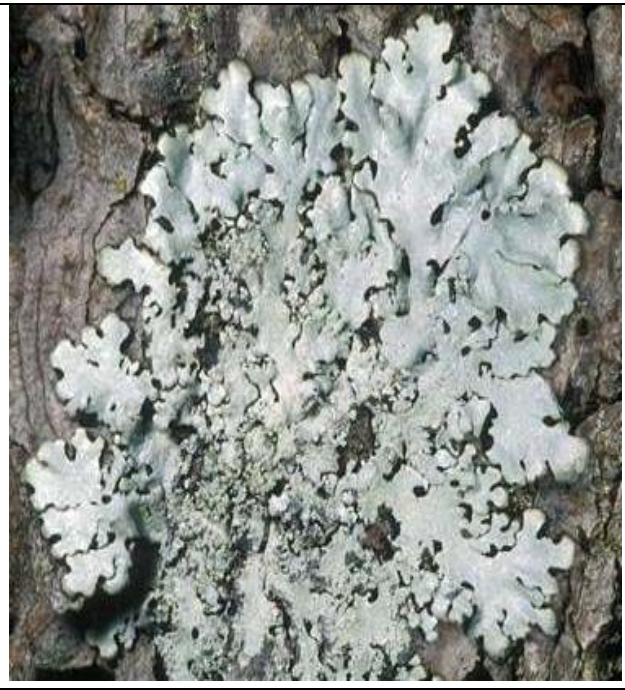


H. livida Photo: Jason Hollinger

- 2) Thallus UV+ **yellow**, fine soresdia, very common. *H. osseoalba* UV+ Grainy loop lichen
2) Thallus UV-, coarse soresdia, rare..... *H. pustulifera* UV- Grainy loop lichen



H. osseoalba Both photos: Sharnoff



H. pustulifera

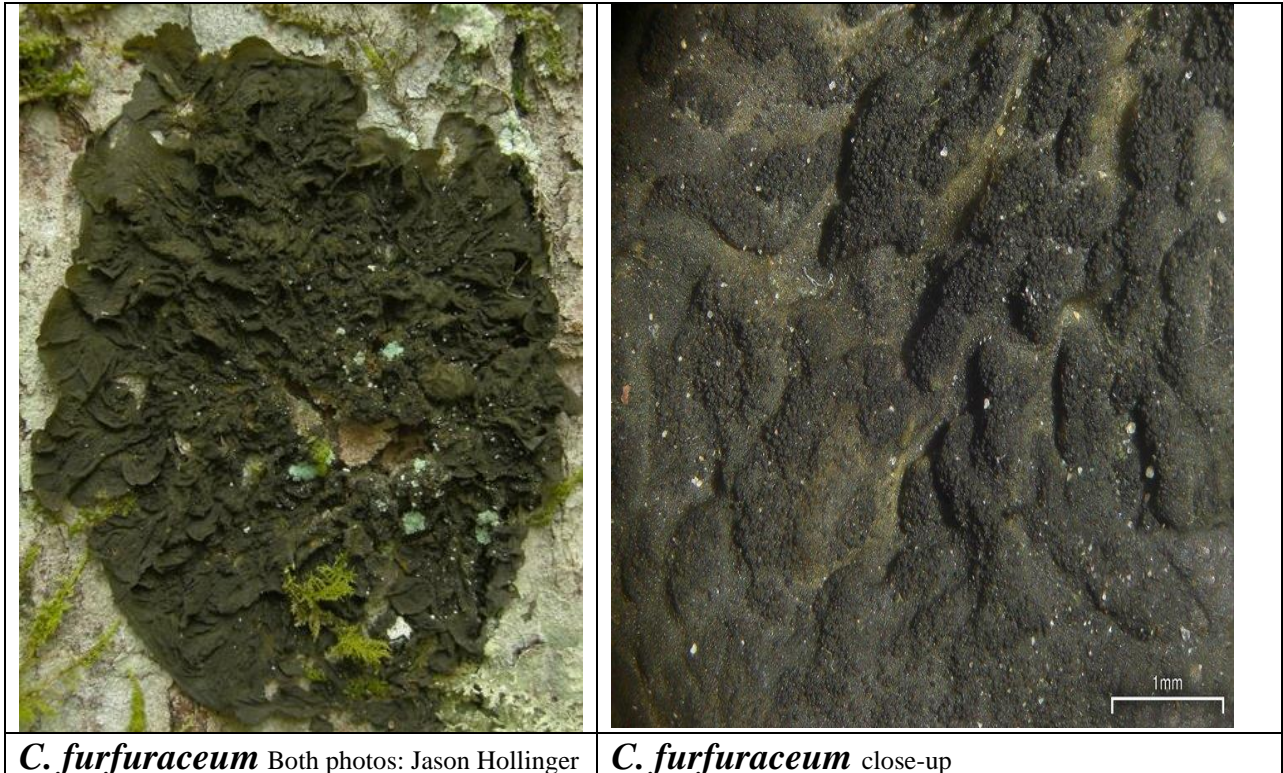
Leptogium/Collema/Physma (Gelatinous Lichens)

Description: Black colored lichens when dry with *Nostoc* cyanobacteria photobiont. Sometimes referred to as gelatinous lichens. Some species are green when moist. Rhizines not present.

Range: Throughout the State.

Sources: Brodo et al. 2001, Kaminsky 2016.

- 1) Thallus isidiate, isidia, globose to cylindrical to flattened, to fan like..... 2
- 1) Thallus lacking isidia, often containing globose or granular structures that appear to be isidia, but don't flake off like isidia..... 9
- 2) Thallus with ridges and pustules..... *Collema furfuraceum*
- 2) Thallus smooth or wrinkled, occasionally with pits but not pustules..... 3



C. furfuraceum Both photos: Jason Hollinger

C. furfuraceum close-up

3) Thallus thin $\leq 0.100 \mu\text{m}$, thin like a dollar bill, when moist easy to see objects through the thallus4

3) Thallus thick $> 0.100 \mu\text{m}$, thicker than a dollar bill, when moist objects look fuzzy when viewed through the thallus or not visible through the thallus ...6

4) Thallus with plentiful small apothecia on the lobe margins and apothecia with small isidia around apothecia margin... *Leptogium marginellum*

4) Thallus not as above.....5

5) Thallus with isidia only on the margin..... *Leptogium marginellum*

5) Thallus with laminal and marginal isidia..... *Leptogium cyanescens*



Leptogium marginellum

L. marginellum Both photos: Jason Hollinger



Leptogium cyanescens Both photos: Jason Hollinger

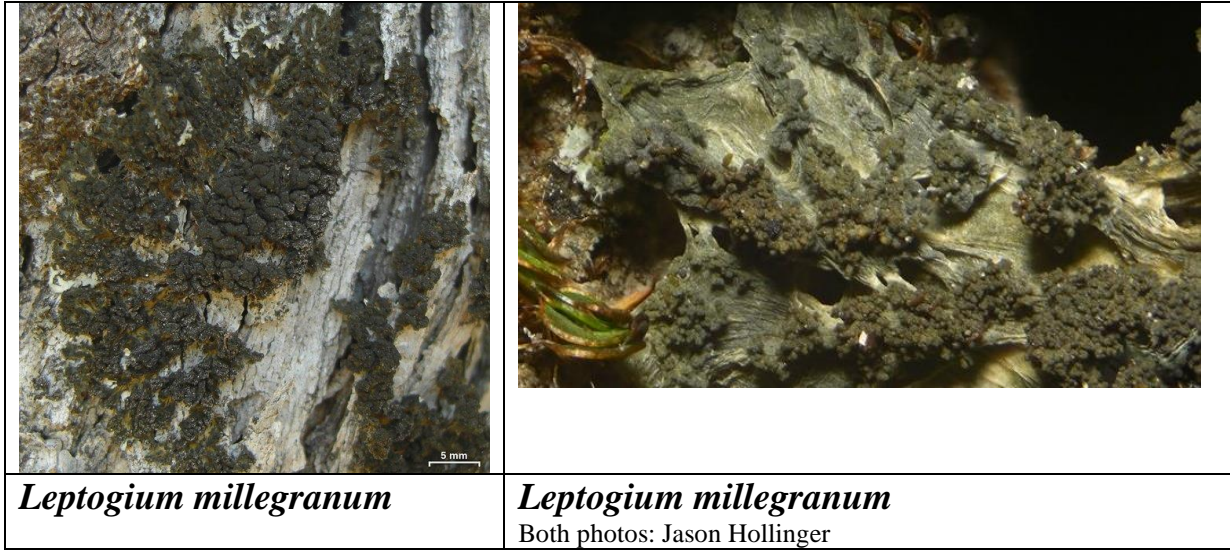
L cyanescens

(*L. cyanescens* has at least 2 cryptic DNA species) (Kaminsky 2016).

6) Lobes canaliculate (wavy) to anastomosing..... 7

6) Lobes for the most part flat and not anastomosing..... 8

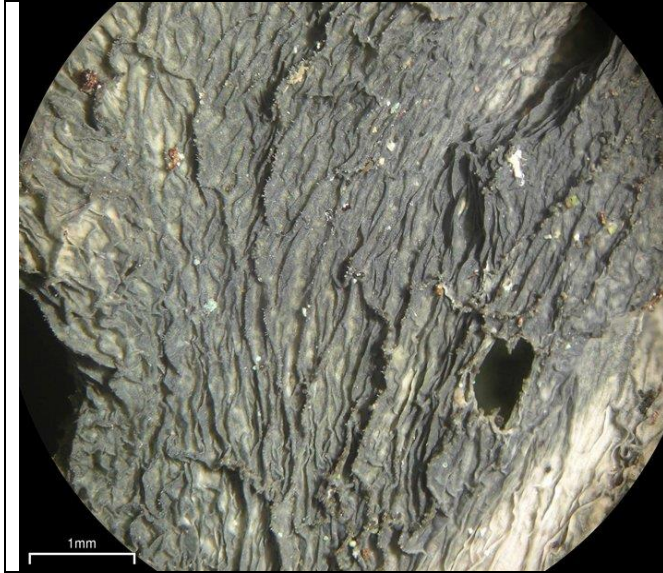
- 7) Thallus canaliculate, granular isidia, lobes not anastomosing***Leptogium sp. #1***
- 7) Thallus not canaliculate, wavy with lots of granular isidia, lobes anastomosing towards center



of thallus..... ***Leptogium millegranum***



- 8) Thallus heavily wrinkled longitudinally, isidia along ridges....***Leptogium isidiosellum***
- 8) Thallus irregularly wrinkled, oftentimes wrinkles indistinct, isidia laminal and marginal
.....***Leptogium austroamericanum***



Leptogium isidiosellum

All photos: Jason Hollinger



L. isidiosellum



L. austroamericanum



L. austroamericanum

- 9) Thallus with white maculae, not gelatinous when wet..... *Physma byrsaeum*
- 9) Thallus not as above, gelatinous when wet..... 10



Physma byrsaeum Photo: Felix Schumm

10) Thallus smooth with ridges and pustules and not pitted, but not wrinkled, apothecia disks occasionally pruinose..... ***Collema pulchellum***

10) Thallus smooth or wrinkled, sometimes pitted, no wrinkles or pustules, apothecia disks not pruinose..... 11



Collema pulchellum
Photo: Sharnoff



C. pulchellum Photo: Troy McMullin

11) Thallus not wrinkled (or visible only at 40x magnification), thallus thin... 12

11) Thallus wrinkled..... 13

12) Thallus with large pits, needs very moist tropical weather, near water, three locations in Florida, Fakahatchee Strand State Preserve, Silver Springs State Park, near St. John's River..... ***Leptogium microstictum***

12) Thallus lacking large pits, sometimes slightly wrinkled, near bodies of water (hammocks, baysgalls, river bottoms) bluish colored..... ***Leptogium azureum***



L. microstictum Photo:inaturalist7347612



Leptogium azureum Photo: Jason Hollinger

13) Lobes wider than long, margins thickened compared to rest of thallus, central Florida, Ocala National Forest and north Peninsula, apothecia tightly appressed to thallus. *Leptogium sessile*

13) Lobes anastomosing or longer than wide..... 14

14) Thallus blue-gray, apothecia surrounded by frilly lobes.....*Leptogium phyllocarpum*

14) Thallus grayish, no frilly lobes15



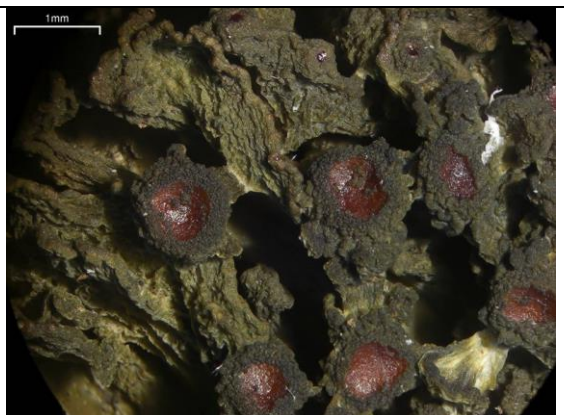
L. sessile Both photos: Jason Hollinger

L. phyllocarpum

15) Thallus with warty knots, and sharp wrinkles, and anastomosing lobes are frequently prostrate..... *Leptogium floridanum*

15) Thallus lacking warty knots, heavily wrinkled, appearing ruffled, less prostrate.....

Leptogium chloromelum



L. floridanum Photo: Pam Hess

L. chloromelum Photo: Jason Hollinger

Other uncommon species: *C. subflaccidum*, *C. pustulatum*, *C. callibotrys*, *C. leptaleum*, *C. conglomeratum*, *L. juniperinum*, *L. adpressum*, *L. fusisporum*, *L. corticola*, *L. sp. nova* from NYBG, *L. tenuissimum*, *L. stipitatum*.

Table 1. Generic comparisons for these gelatinous lichens present in Florida.

Genus	Cross section	Reproductive structures	Taxonomic and FL distribution comments	Additional morphological characteristics
<i>Collema</i>	1 cell thick, no cortex	Isidia or apothecia	All species, uncommon, rare	Larger thallus than <i>Enchylium</i> and <i>Rostania</i>
<i>Enchylium</i>	1 cell thick, no cortex	Apothecia	One rare species, formally <i>Collema</i> - now <i>Enchylium conglomeratum</i>	many apothecia, ascospores two septate
<i>Leptogium</i>	1 cell thick cortex present	Isidia or apothecia	Species are common, uncommon, rare	Wide range of characters
<i>Physma</i>	Several cells thick	Apothecia	One very rare species.	thallus maculae leathery and rubbery, almost stretched
<i>Rostania</i>	1 cell thick, no cortex	Apothecia	One rare species, formerly <i>Collema</i> - now <i>Rostania callibotrys</i>	Ascospores globose - subglobose - muriform
<i>Scytinium</i>	Thallus with pseudocortex	Apothecia	1 rare or under collected species, segregate from <i>Leptogium</i>	On sand and moss, lobes <1 mm wide (smallest of FL jelly lichens)

Table 2. Comparison table of the gelatinous lichens present in Florida.

Scientific Name	Wrinkled/ Smooth	Apothecia /Isidia	Additional distinct characteristics	Locality comments
<i>Collema furfuraceum</i>	Smooth	Apothecia	Ridged and pustulate	common on Gulf Coast, and perennially wet areas
<i>Collema leptaleum</i>	---	Isidia	Apothecia stipitate	Not collected in 50+ years
<i>Collema pulchellum</i>	Smooth	Apothecia	Ridged, pustulate, sometimes with pruinose apothecial disk	
<i>Collema pustulatum</i>	Smooth	Apothecia	Spores are ellipsoid, more than 2 cells	
<i>Collema subflaccidum</i>	Smooth	Isidia	Not ridged or pustulate	Doubtful of presence in FL
<i>Enchylium conglomeratum</i> (syn= <i>Collema</i>)	Smooth	Apothecia	spores 2 celled, no cortex	
<i>Leptogium adpressum</i>	Wrinkled	Apothecia	Spores acicular	
<i>Leptogium austroamericanum</i>	Wrinkled	Isidia	Irregularly wrinkled, thallus thicker than US dollar bill	Common throughout Florida
<i>Leptogium azureum</i>	Smooth	Apothecia	Bluish color, can be mistaken for <i>L. cyanescens</i>	Common along rivers and swamps, but not coastal habitats
<i>Leptogium chloromelum</i>	Wrinkled	Apothecia	Lobes anastomosing thallus gray or gray green	
<i>Leptogium corticola</i>	Wrinkled	Apothecia	Lobes not anastomosing, spore's ellipsoid or subfusiform	May reflect the unidentified material in NY, see below.
<i>Leptogium cyanescens</i>	Smooth	Isidia	Thallus thin like a US dollar bill	Common throughout Florida
<i>Leptogium floridanum</i>	Wrinkled	Apothecia	Lobes anastomosing thallus warty, bluish color	
<i>Leptogium fusisporum</i>	Wrinkled	Apothecia	Spores fusiform and brown	
<i>Leptogium isidiosellum</i>	Wrinkled	Isidia	Longitudinally wrinkled, can be densely isidiate	Common throughout Florida
<i>Leptogium juniperinum</i>	Smooth	Apothecia	Lobes 2-3 mm wide	Panhandle, reported by Calkins, not on CNALH, dubious
<i>Leptogium marginellum</i>	Smooth	Isidia, and/or	Isidia on lobe margins, or growing around rim	Common throughout Florida

		apothecia	of tiny apothecia	
<i>Leptogium microstictum</i>	Smooth	Apothecia	Thallus pitted	Subtropical coastal habitats, and inland localities near water
<i>Leptogium millegranum</i>	Wrinkled	Isidia	Lobes anastomosing, isidia granular	
<i>Leptogium phyllocarpum</i>	Wrinkled	Apothecia	Lobes anastomosing, thallus gray	
<i>Leptogium sessile</i>	Wrinkled	Apothecia	Apothecia appear to be sunken	
<i>Leptogium</i> sp. from NY	Wrinkled	Apothecia	Lobes not anastomosing, spore's ellipsoid or subfusiform, slightly hairy on upper side	May be the same as B. Moore material called <i>L. corticola</i>
<i>Leptogium</i> sp. from FLAS	Wrinkled	Isidia	Lobes canaliculate wavy, occasionally anastomosing, globose isidia	Throughout Florida
<i>Leptogium stipitatum</i>	Wrinkled	Apothecia	apothecia stipitate, at ends of hollow lobes	Last collected in Archbold Biol. Station, 1986
<i>Physma byrsaeum</i>	Wrinkled	Apothecia	Leathery thallus, very thick, white maculae	2 currently known localities in Florida
<i>Rostania callibotrys</i> (Syn= <i>Collema</i>)	Wrinkled	Apothecia	Spores globose, more than 2 cells	
" <i>Scytinium tenuissimum</i> " (syn= <i>Leptogium</i>)	Wrinkled	Apothecia	Very small thallus, <1 mm wide, on sand and moss	Juniper Creek Take Out Area, probably under-collected due to small size

Lobaria (Lung Lichen)

Description: Foliose. Lobes medium to large, attached to bark loosely. Upper surface gray when dry, greenish when wet. White medulla. Florida species with apothecia only. Apothecial rim same color as thallus, disk reddish. Unique feature: **Lower side with fuzzy white or black tomentose cover, with occasional holes.**

Range: North of Lake Okeechobee in Florida.

Notes: This genus may be an old growth indicator in Florida forests. Lobe shape and size often resemble *Pseudoparmelia* species. However, *Lobaria* has a tomentose underside, and has a dull gray thallus color when dry.

Sources: Brodo et al. 2001.

Key:

- 1) Lobules common, at the thallus margin, apothecia and pycnidia rare. Upper cortex usually K+ yellow *L. tenuis* Slender lung lichen
- 1) Lobules rare, apothecia common and pycnidia often present. Upper cortex usually K- *L. ravenelii* Dixie lung lichen



L. tenuis Both photos: Sharnoff

L. ravenelii

Myelochroa (Axil-bristle Lichen)

Description: Foliose. Lobes small to medium, 3-4 mm wide, closely attached to the bark, edges adnate but not attached. Gray green to blue green upper surface color. Medulla white with **some yellowing under the soredia** and apothecia. Apothecia rare. Lower surface black. Apothecia or soredia present, occasionally branched; **soredia coarse in irregular soralia**. **Cilia sparse unbranched and in the lobe exile**, and sometimes on the margins. Rhizines present, unbranched or forked, short. Cortex K+ yellow, atranorin. Unique feature(s): This genus is unique for its chemistry and its marginal cilia.

Myelochora aurulenta Powdery axil-bristle lichen

Foliose. Medulla white to yellow (yellow mostly around soredia). **Coarse soredia**. Lower side black.

Range: Only known from North Florida, at this time.

Notes: Uncommon. May be an old growth indicator on the edge of its range.

Sources: Brodo et al. 2001.



M. aurulenta Both photos: Sharnoff



M. aurulenta

Nephroma (Kidney Lichen)

Description: Foliose. Lobes medium, closely attached to the bark, edges upturned, adnate but not attached. Gray green to brown colored upper surface color (cyanobacterial algae). Medulla white. Lower surface brown or black. Apothecia or isidia present, occasionally branched; never soreciate. **Apothecia kidney bean shaped which gives the genus its name. Apothecia produced on the lower side of the lobe tips. Lower surface smooth and shiny or fuzzy with a thin tomentum**, without rhizines. The color of the algal layer and the type of lower surface are helpful in distinguishing this genus.

Nephroma helveticum Fringed kidney lichen

Foliose. Dark brown. Often isidiate, lobes **fringed with lobules and flat isidia**. Apothecia rare, flat on lower surface.

Range: Only known from the Florida Panhandle.

Notes: Only one known site in Florida. It should be searched for in more areas.

Sources: Brodo et al. 2001.



N. helveticum Photo: Sharnoff

Normandina (Elf-ear Lichen)

Description: Small, green to slightly bluish green squamulose lichen, with very thin squamules, 0.7-2.5 mm across, becoming lobed in well-developed specimens, the edge of each squamule thickened into a thin, uniform, raised rim; often becoming soresiate around the margins or on the upper surface. Photobiont green algae. Fruiting bodies perithecia, but very rare. Chemical reactions all negative, but contains zeorin.

Normandina pulchella Elf-ear lichen

Small foliose to squamulose, very small thin (0.7- 2.5 mm) slightly **bluish aqua-green squamules** and a thickened lobe margin. Usually growing on moss or on other lichens.

Range: Uncommon in Florida; the range is not well studied.

Notes: This lichen resembles the squamules of *Cladonia*, but the squamules of *Normandina* are more scattered and rounded with thickened margins and a blue green color.

Sources: Brodo et al. 2001



N. pulchella Photo: Sharnoff

Pannaria (Shingle Lichen) - and related genera
Including ***Parmeliella***, ***Lepidocollema*** and ***Psorula***

Description: Foliose to squamulose. Lobes small, tightly attached to the substrate. Gray upper surface. White medulla. Apothecia present, red disk, rim same color as thallus. Florida species not soresiate. Spot tests negative, no chemicals. Unique features: **Thallus color bluish-black**. Following Jorgensen’s revisions, many species formerly considered in *Pannaria* are now under *Fuscopannaria*, *Moelloeropsis*, ***Parmeliella***, *Protopannaria*, and *Psoroma*.

Range: South to Lake Kissimmee in Florida.



Notes: Specimens can be extremely fertile and the immature apothecia may resemble large, wide isidia. Color varies as moisture content varies.

Sources: Brodo et al. 2001; Jorgensen 2000.

- 1) Apothecia present ...2
- 1) Isida present5

- 2) Thallus gelatinous when wet, with maculae, central Florida ***Physma byrsaeum***
- 2) Thallus not gelatinous, lacking maculae 3

- 3) Thallus squamulose ***Fuscopannaria leucosticta***
- 3) Thallus foliose4

	
<p><i>Physma byrsaeum</i> Photo: Felix Schumm</p>	<p><i>Fuscopannaria leucosticta</i> Photo: Sharnoff</p>

- 4) Thallus slightly wrinkled, lobes larger, 2-6 mm wide, with branching veins or longitudinal ridges along the upper surface, apothecia margins bumpy, cortex P-, Medulla P+ deep orange ***Pannaria lurida*** Veined shingle lichen

4) Thallus not wrinkled, lobes mostly smaller, 0.7 to 2 mm wide, smooth, apothecial margins smooth or even or toothed... *Pannaria rubiginosa* Brown-eyed shingle lichen



P. lurida Photo: Rosentreter
variation in lobe size and color from the same tree



P. rubiginosa Photo: Troy McMullin



P. lurida Photo: Sharnoff



P. rubiginosa Photo: Troy McMullin

5) Thallus squamulose, lobes reddish, isidia predominately lobulate on the lobe margins,
..... *Parmeliella pannosa* Shingle lichen

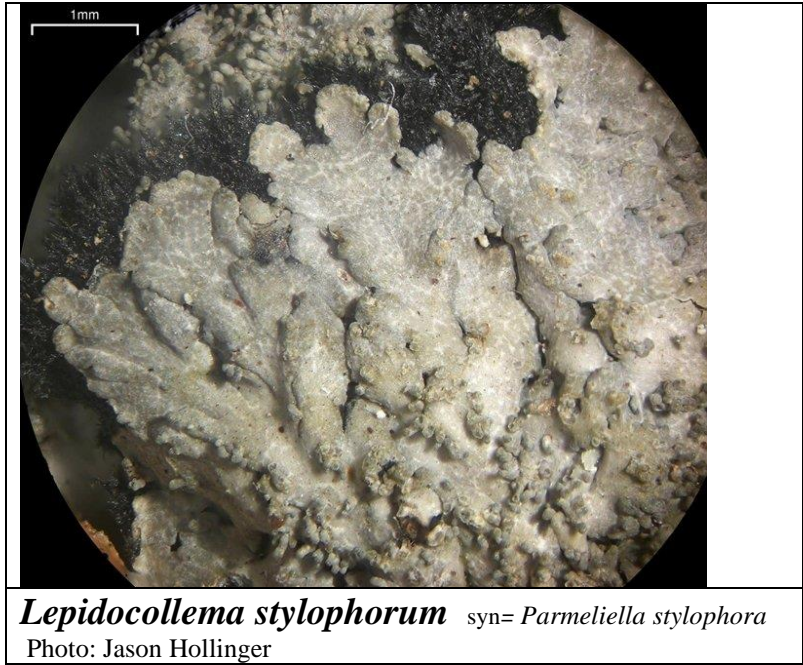
5) Thallus clearly foliose or with isidia that are not lobulate on the lobe margins, or with a
hypothallus6



Parmeliella pannosa Photo: Jason Hollinger

- 6) Thallus with a black hypothallus.....7
- 6) Thallus with a blue hypothallus or lacking a hypothallus9

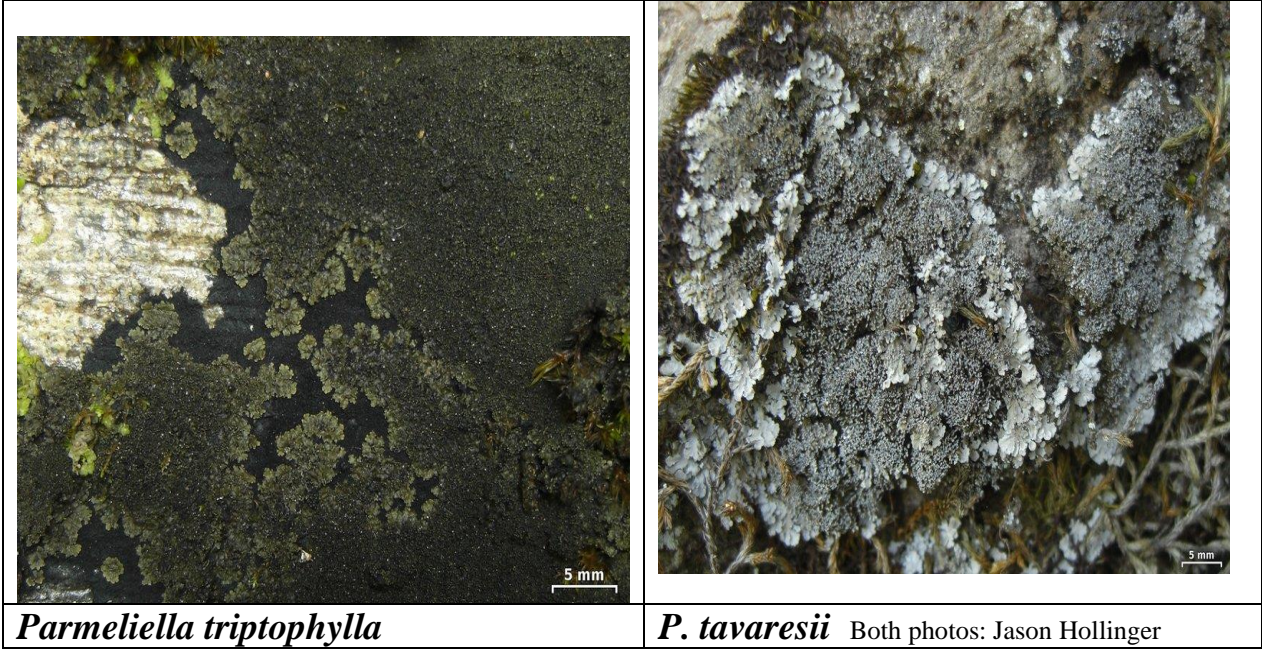
- 7) Thallus not rosette forming.....8
- 7) Thallus forming a rosette, lobes 2 mm wide, thallus grayish, with a conspicuous black hypothallus..... ***Lepidocollema stylophorum*** Shingle lichen



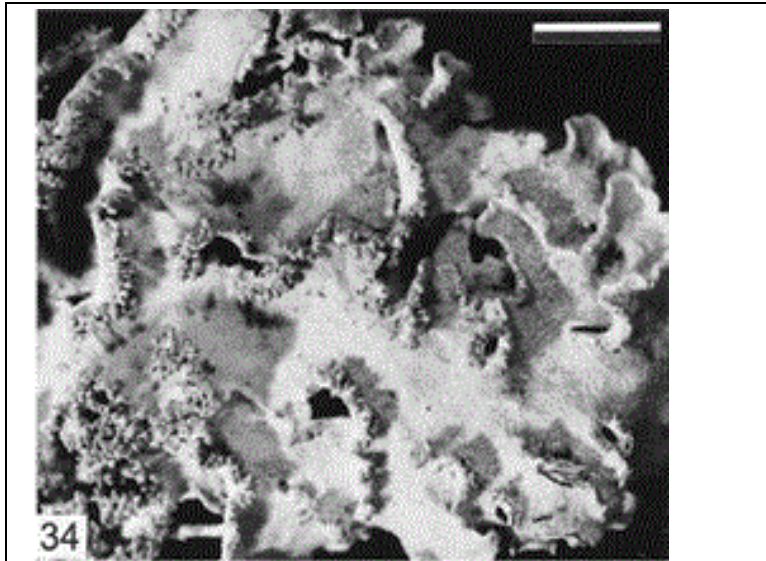
8) Thallus more or less shiny, continuous, thallus **grey-blue to brown**, more or less shiny, and developing on an extended, thin, **blackish hypothallus**, small-foliose to squamulose, heteromerous, 75-100 µm thick, thallus scattered to contiguous, to 1(-1.5) mm wide, incised, with coralloid marginal isidia, thallus and medulla K-, C-, KC-, P-, UV-. Chemistry: without lichen substances, photobiont cyanobacteria (*Nostoc*, the cells in clusters)

Parmeliella triptophylla Black-bordered shingle lichen

8) Thallus not shiny, with finger-like isidia on the lobe margins.... ***Pannaria tavaresii***
 Coral-rimmed shingle lichen



9) Lobes 3-5 mm wide, thallus brownish with a yellowish buff, conspicuous bluish hypothallus usually present, wrinkled when dry, swelling and gelatinous when wet, often on oaks, isidiate margin, Pd+ orange; Gulf region.. *Pannaria elatior* (isidiate counterpart of *P. lurida*)



Pannaria elatior black and white photo from Jorgensen 2000

Related species reported from Florida but believed to be rare, include:

Psorula rufonigra is a saxicolous species with a dark blue-green color. It varies from small rosettes to larger colony specimens. Found growing on rock and over and possibly parasitic on cushions of the cyanobacterial lichen *Spilonema revertens*. Looks similar to *Psora* species but the lower surface is dark, and the Med is K-. Often in moist habitats.



Psorula rufonigra Both photos: Jason Hollinger

P. rufonigra

Parmelinopsis (Shield Lichen)

Description: Pale gray foliose lichens, lobes 0.5- 6 mm wide, cilia present, at least in the lobe axils, black but not bulbous at the base, often sparse, no pseudocyphellae or maculae, lower surface nearly uniformly **black with unbranched rhizines**, medulla white. Photobiont green, Apothecia uncommon. Chemistry: Cortex K+yellow (atranorin); medulla at least KC+red, usually C+ red or pink.

Range: SE US, North of Lake Okeechobee in Florida.

Notes: Some authors have put these species in with the *Hypotrachyna* (Loop lichen) genus that has branched rhizines. Superficially they look similar.

Sources: Brodo et al. 2001.; Harris 1995.

Key:

1) Thallus isidiate, medulla UV+ white or UV-... 2

1) Thallus sorediate, medulla UV+ ... 3

2) Isidia usually tipped with cilia, medulla UV-, KC+ purplish-pink, C-

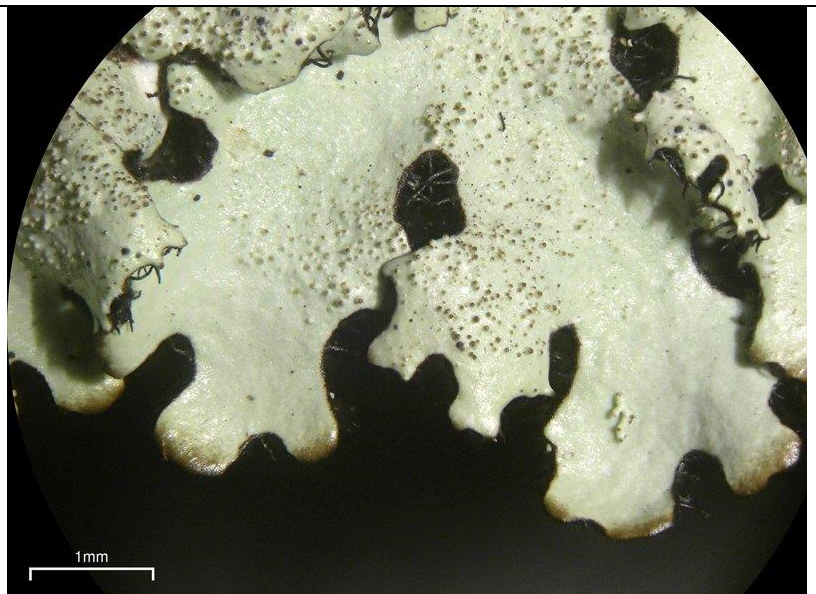
..... ***P. horrescens*** Hairy-spined shield lichen

2) Isidia usually without cilia, medulla UV+ white, KC+ red, C+ pink, common

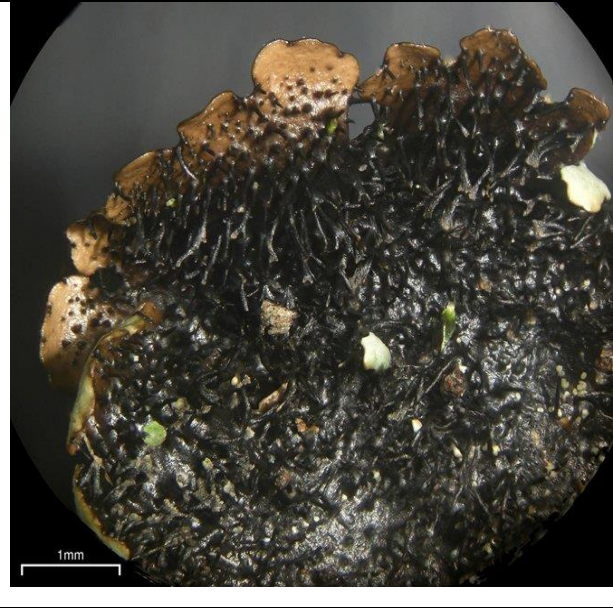
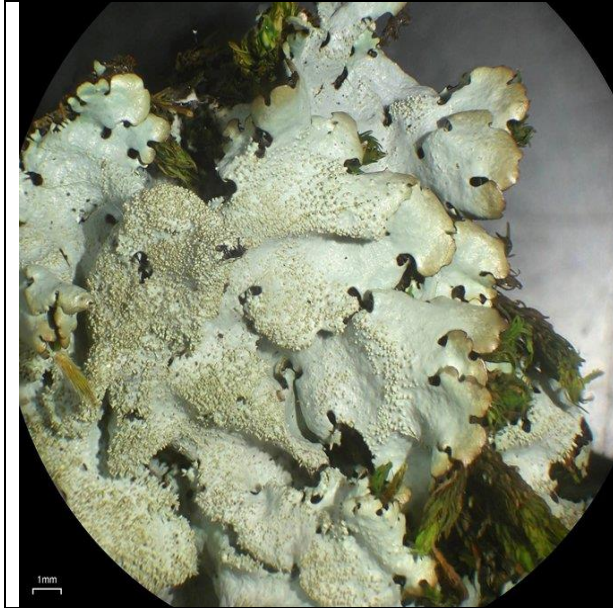
..... ***P. minarum*** Hairless-spined shield lichen



P. horrescens Photo: Sharnoff



P. horrescens Photo: Jason Hollinger



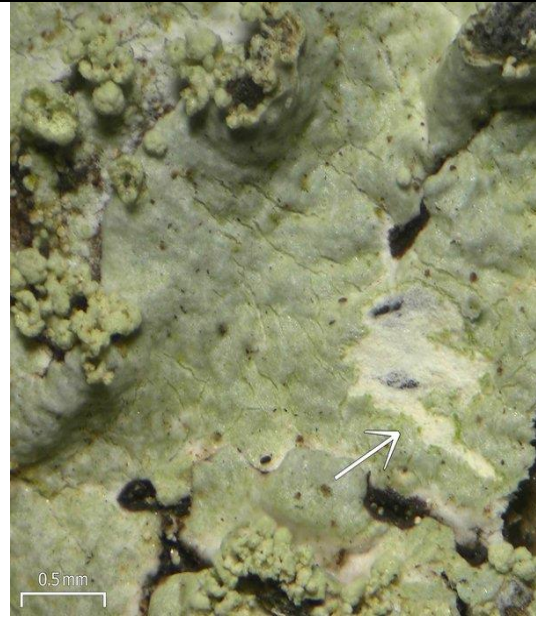
P. minarum Both photos: Jason Hollinger

P. minarum

3) Soredia coarse, derived from pustules, throughout Florida ... ***P. spumosa*** Pustuled shield lichen

3) Soredia powdery (farinose), not derived from pustules, rare or absent in Florida,

..... ***P. cryptochlora*** Powdery shield lichen



P. spumosa Photo: Sharnoff

P. spumosa Photo: Jason Hollinger



P. cryptochlora Photo: Sharnoff

Parmeliopsis (Starburst Lichen)

Description: Small, closely appressed, gray to yellow-green, foliose lichen with very narrow, radiating lobes, 0.5-2 mm wide: sorediate. Underside mostly white to very dark brown, with similarly colored unbranched rhizines. Photobiont green (*Trebouxia*). Apothecia uncommon with brown discs. Cortex has atranorin or usnic acid. Medulla lacks these chemicals. Grows on bark and wood in exposed habitats.

Parmeliopsis subambigua Green starburst lichen

Foliose. Cortex yellow. Soredia forming from pustules, more diffuse than the other species of *Parmeliopsis*, and are developed from pustules on the upper surface. Pale yellow-white lower surface.

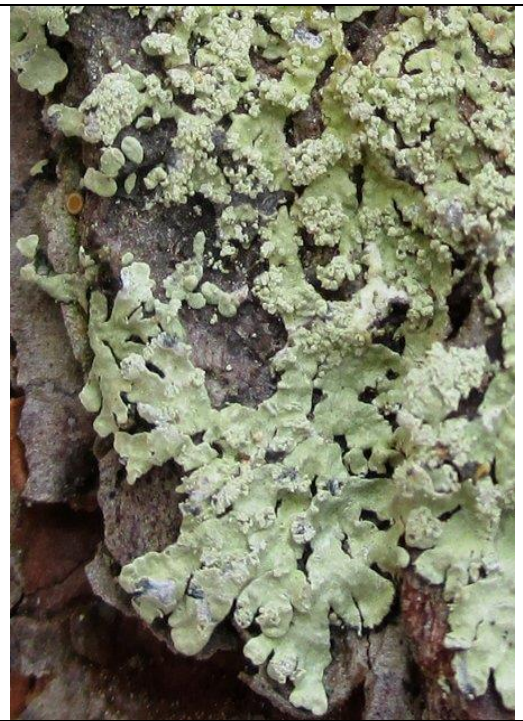
Range: Northern Florida south to Orlando.

Notes: Infrequent to rare.

Sources: Brodo et al. 2001.



P. subambigua Photo: Sharnoff



P. subambigua Photo: Jason Hollinger

Parmotrema (Shield Lichen)

Description: Foliose. **Lobes large**, attached to bark at base, lobes free. Gray, gray-green to yellow-green upper surface. Medulla white or yellow (only 2 yellow species). Isidia, soredia or apothecia present. Ciliate or non-ciliate and lower surface black, brown, white or mixed. Spot tests various. Unique features: **Large lobes**, largest lobes in Florida lichens.

Range: Throughout Florida.

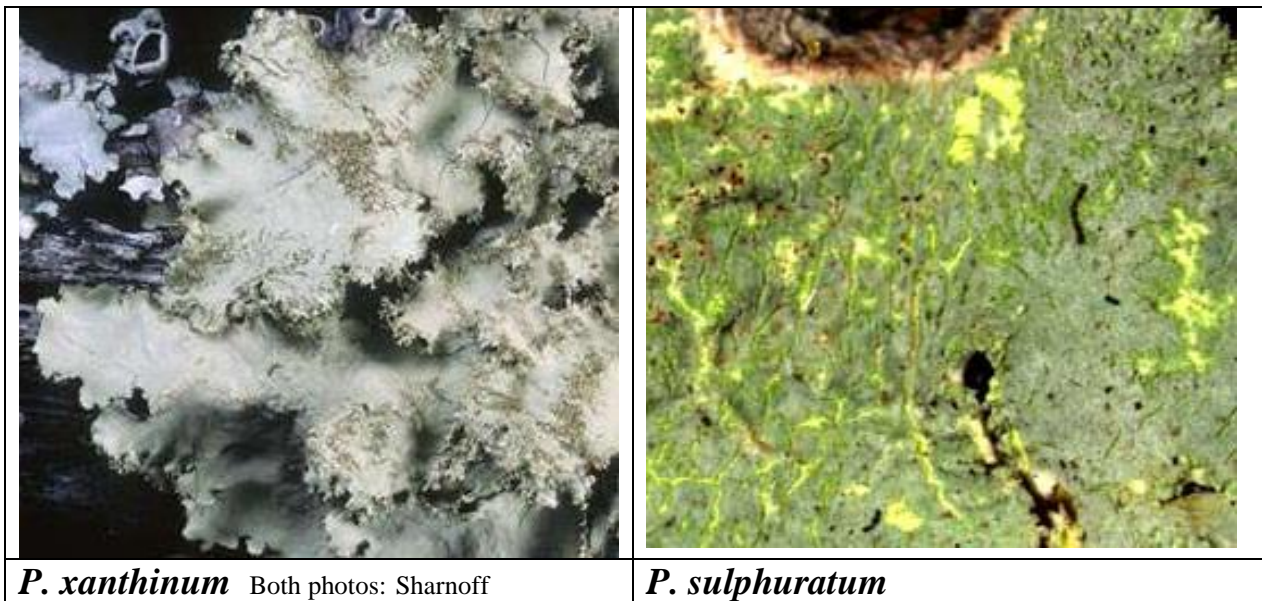
Notes: These are distinctive taxa because of their large lobes. This genus is often found on young twigs with no sexual characteristics. It can also be found in miniature form with small lobes on small twigs, and look like another genus.

Sources: Brodo et al. 2001; Harris 1995; Jon Dey unpublished keys to Southeast United States; Lendemer & Harris 2016; Rosentreter & DeBolt 2020.

- 1a. Cilia present 2
- 1b. Cilia absent 13
- 2a. Isidiate 3
- 2b. Sorediate or lacking both isidia and soredia (**NIS**) 7

- 3a. Cortex or medulla yellow or pale yellow 4
- 3b. Cortex white or grey 5

- 4a. Medulla white, cortex pale yellowish green (usnic acid), Med K-..... ***P. xanthinum***
Green ruffle lichen
- 4b. Medulla bright yellow ***P. sulphuratum*** Sulfur ruffle lichen



- 5a Maculate, thallus cracked..... ***P. subsidiosum*** Salted ruffle lichen
- 5b Not maculate, thallus not cracked..... 6



P. xanthinum Photo: Jason Hollinger



P. subisidiosum Photo: Sharnoff

6a. Isidia dense, becoming branched, coralloid with apical cilia, UV-, medulla K+ yel

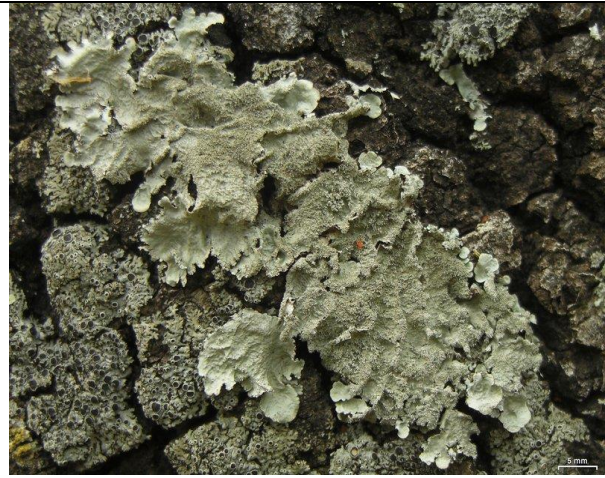
..... ***P. crinitum*** Salted ruffle lichen

6b. Isidia common, rarely dense, UV+ yel, Med K+ red, infrequent ***P. ultralucens***

Spotted gray ruffle lichen



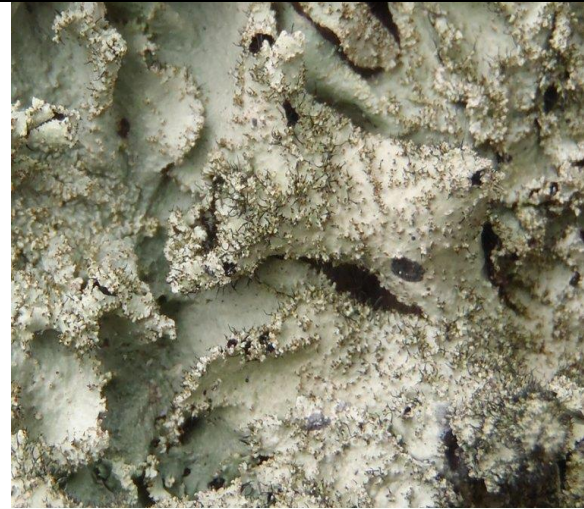
P. crinitum Photo: Curtis Bjork



P. crinitum Photo: Jason Hollinger



P. ultralucens Photo: Sharnoff



P. ultralucens Photo: Jason Hollinger

7a. Sorediate, apothecia absent 8

7b. Not sorediate, apothecia present 11

8a Thallus with small fine cracks, visible **maculae**.....*P. reticulatum*

syn=*Rimelia* Cracked ruffle lichen

8b Thallus without cracks, maculae often present..... 9



P. reticulatum Photo: Sharnoff

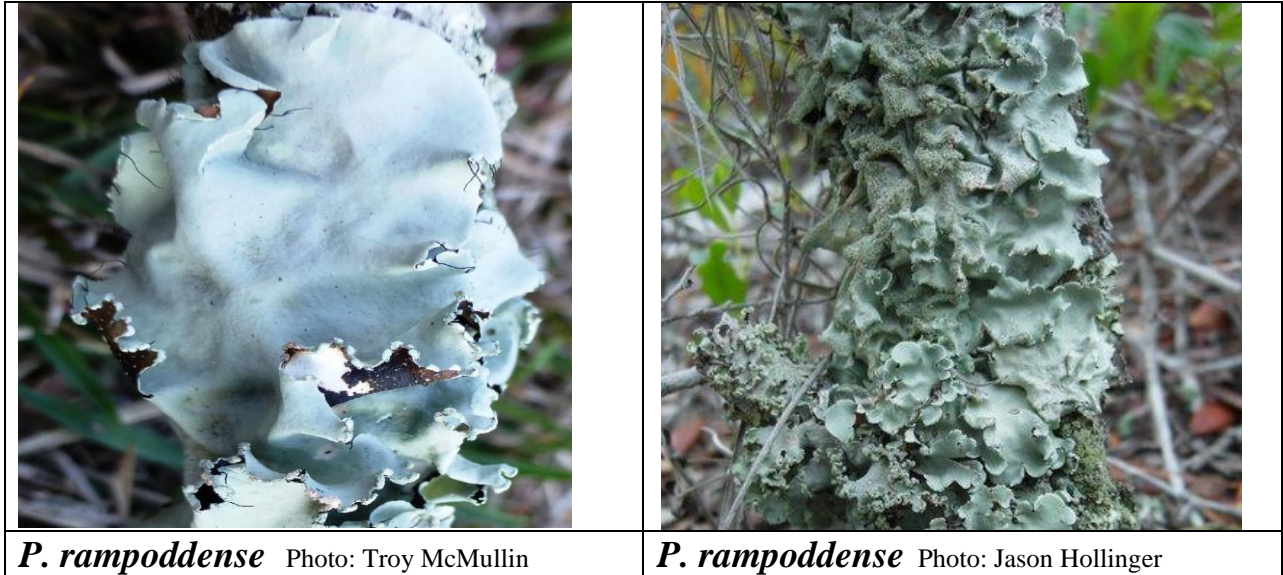


P. reticulatum note white maculate on cortex

9a. Soredia marginal on lobe tips, not maculate, Med K-, UV++ bright blue (brighter than other UV+ so it's a good indicator amongst other *Parmotremas*), **Common**

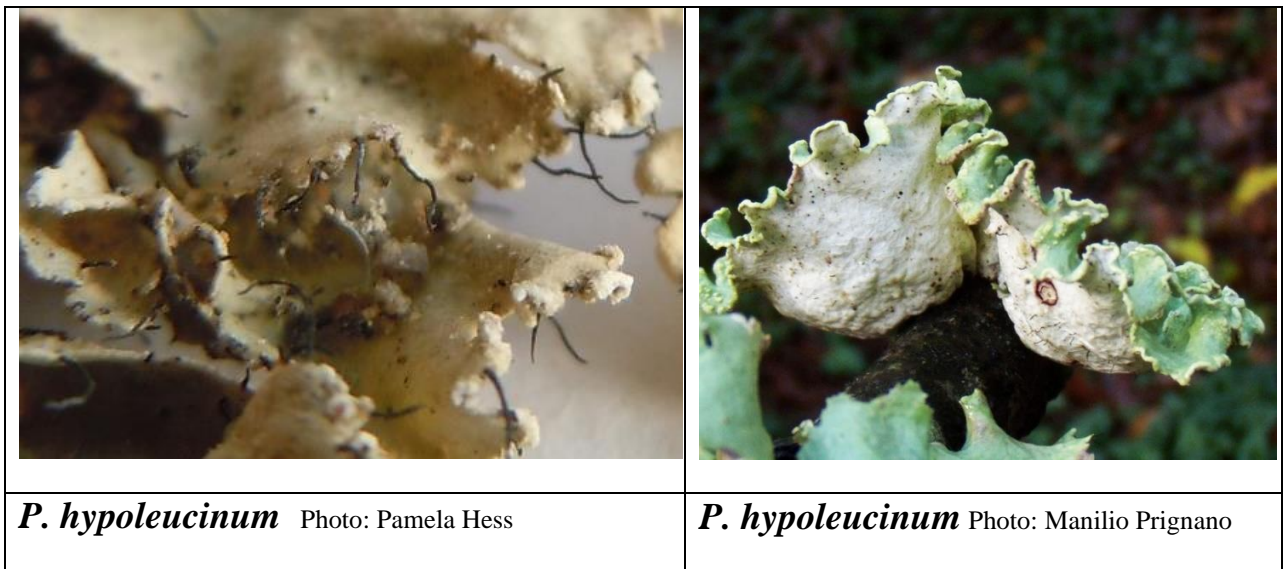
.....*P. rampoddense* Powdered long-whisker ruffle lichen

9b. Soredia marginal not elevated on lobe tips, often weakly to strongly maculate, Med K+ yel to red or orange, UV-..... 10



10a. Med K+ yellow to orange, Pd+orange, UV-, infrequent
 *P. hypoleucinum* Pd+ Orange powdered ruffle lichen

10b. Medulla K+ yellow to red, Pd+ yellow, UV- *P. hypotropum* Pd+ Y powdered ruffle lichen





P. hypotropum Photo: Pamela Hess



P. hypotropum Photo: Jason Hollinger

11a. Cortex maculate, lower surface white to mottled brown margins.....12

11b. Cortex not maculate, Pd+ red, lobe margins dissected, lower surface **brown** margins, **pycnida numerous** *P. submarginale* Unperforated ruffle lichen syn: *P. michauxianum*



P. submarginale Photo: Jason Hollinger



P. submarginale Photo: Sharnoff

12a. UV-, lower surface black, margin white, **perforated apothecia**, Med K+ yel, **common to abundant** *P. perforatum* Perforated ruffle lichen

12b. UV+, lower surface black, margin white, perforated apothecia, Med K-, KC+ pink, infrequent *P. subrigidum* (looks like *P. perforatum*) KC+ Perforated ruffle lichen



P. perforatum Photo: Sharnoff



P. perforatum Photo: Jason Hollinger



P. subrigidum Photo: Troy McMullin



P. subrigidum Photo: Jason Hollinger

13a. Isidiate 14
 13b. Sorediate or lacking both soredia and isidia... 15

14a. Med white, med C+ red, **abundant** in Florida *P. tinctorum* Palm ruffle lichen

14b. **Med yellow**, med C+ pink *P. endosulphureum* Yellow-colored ruffle lichen



P. tinctorum Photo: Sharnoff



P. endosulphureum Photo: Pamela Hess

15a. Thallus non-sorediate, Med Pd+red, south Florida ***P. overeemii*** Shield lichen

syn= *P. zollingeri*

15b. Thallus sorediate **16**



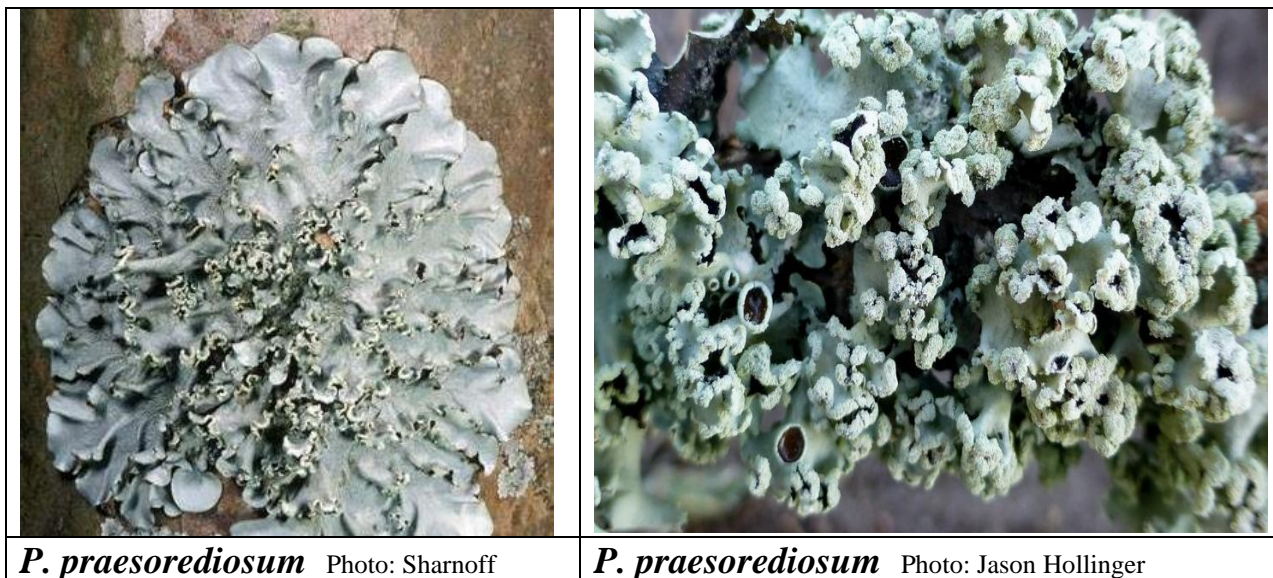
P. overeemii Both photos: Jason Hollinger



P. overeemii

16a. Soredia crescent shaped, lower surface white margin, **narrower lobes**, Med K-, P-

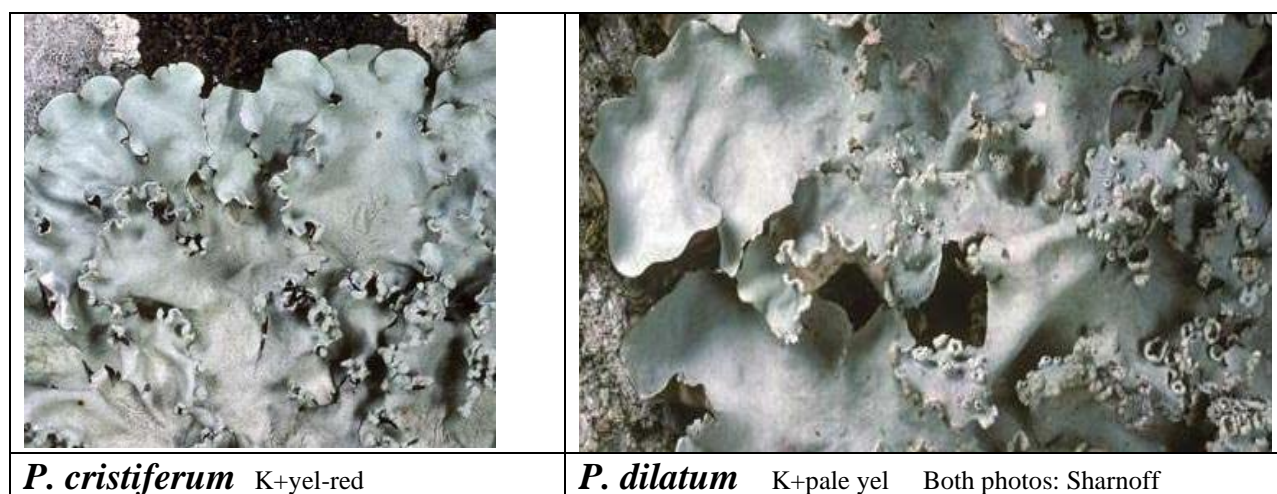
..... ***P. praesorediosum*** Powder-crown ruffle lichen) (part of the *P. cristiferum* complex)



16b. Soredia marginal, **wider lobes**, lower surface with brown margin.....
*P. cristiferum* **complex** Unwhiskered ruffle lichen
 Parmotrema cristiferum* **complex are chemomorphs that may be difficult to detect in the field.

Table 1. Chemomorphs in the *P. cristiferum* complex. Bolded characteristics are helpful.

Species	Soredia	Lower side colors	Medulla reactions
<i>P. cristiferum</i>	marginal or lacking	brown margin	K+yel→red, P+orange
<i>P. dilatatum</i> (Most common)	marginal on small	broad brown zone on margin	K+pale yel, P+red→orange
<i>P. gardneri</i>	marginal to terminal occasional sparse cilia	broad brown zone on margin	K-, P+red-orange
<i>P. praesorediosum</i>	crenate shaped	occasionally white margin	K-, P-





P. gardneri K- Photo: Pamela Hess



P. gardneri K- Photo: Jason Hollinger

Uncommon or rare *Parmotrema* species in Florida:

P. austrosinese- Lacking cilia, soralia marginal, medulla K-, KC+ red, C+ red

P. dominicanum- Lacking marginal cilia, only species in US with yellowish soralia

P. mellissii- With cilia, soredia becoming isidiate, medulla UV+ blue

P. neotropicum- Isidiate, ciliate, **maculate**, med PD+ orange, K+ red, KC-, C-, Similar to *P.*

rubefaciens- Lacking marginal cilia, sorediate, medulla K+ yellow to red

P. subtinctorium- Isidiate, ciliate, **maculate**, medulla PD+ yellow, K+ red, KC+ red, C-,
syn=*Canomaculina subtinctoria*

P. wrightii- Without cilia, apothecia present, med C-, K+ yellow to red, PD+ red or orange.

Known from a few collections in Everglades National Park.

Table 2. Parmotrema comparison table for the Florida species. Sor=sorediate, I=isidiate; Med=medulla; Colors bl=black, br=brown, b=blue, Y=yellow, R= red, O= orange, w=white; Abundance ratings = Ab --c=common or color, u=uncommon, r=rare. y=yes, no=no; Og= old growth indicator; UV reaction minus=--, positive=+and the color.

Species	Cilia	Sor	I	Med c	Lower side c	notes	Med K	Med PD	Med UV	Ab
<i>crinitum</i>	y	No	I	w	bl to br, w margin	isidia ciliate, isidia dense	Y	O	--	c
<i>cristiferum</i>	no	Sor	no	w	bl, to br margins	sorediate	Y to R	O	--	c
<i>dilatatum</i>	no	Sor	no	w	bl, w/ br, margins	sorediate	pale Y	R to R-O	--	c
<i>endosulphureum</i>	no	No	I	y	dark br to bl br, margin	Og	Y	--	--	u
<i>gardneri</i>	no	Sor	no	w	br margin	broad br zone	--	R- O	--	c
<i>hypoleucinum</i>	y	Sor	no	w		medulla UV-	Y- O	O	--	u
<i>hypotropum</i>	y	Sor	no	w		medulla UV-	Y to R	Y	--	u
<i>overeemii</i>	no	No	no	w				R		r
<i>perforatum</i>	Y	No	no	w	dark bl, w margin	apothecia perforated	Y	--	--	c
<i>praesorediosum</i>	no	Sor	no	w	br to bl, w margin	crescent shaped soredia	--	--	--	c
<i>rampoddense</i>	y	Sor	no	w	bl		--	--	b-w	c
<i>reticulatum</i>	y	Sor	no	w	bl w/ br margin	maculae and cracks lots	R	O		c
<i>rigidum</i>	y	No	no	w						
<i>subisidiosum</i>	y	No	I	w	bl with br margin	reticulate maculae & cracks lots	R	Y-O	--	c
<i>submarginale</i>	y	No	no	w	bl center, br on margin	apothecia not perforated	--	R to R-O	--	c
<i>subrigidum</i>	y	No	no	w	bl w margin	apothecia perforated	--	--	--	
<i>subtinctorium</i>	y	No	I	w	br, never bl	maculae not reticulate cracks	R	Y	--	u
<i>sulphuratum</i>	y	No	I	y	bl, to br at margin	Og	--	--	--	u
<i>tinctorum</i>	no	No	I	w	bl center, br zone broad		--	--		c
<i>ultralucens</i>	y	No	I	w	bl with br margin		R	O	bright Y	u
<i>xanthinum</i>	y	No	I	w	bl, to br, margin	cortex Y-ish	--	--	--	u

Peltigera (Pelt Lichen)

Description: Foliose lobes medium to large. Lower surface felty whitish, most species with veins. Upper cortex dark gray to brownish to green. Some species have cephalodia containing *Nostoc*, cyanobacteria. Most species grow on soil or mossy rocks, some on tree bases. Apothecia marginal.

Peltigera polydactylon Many-fruited pelt lichen

Only one species is known from Florida. Lower surface with black veins. Rhizines in localized structures. Known from three locations in Florida. Thallus greenish gray, very shiny above, without pruina or tomentum. Lobes 7-10 mm across with crisped margins. Apothecia red-brown, saddle-shaped, on upturned lobes.

Range: Three known locations. Mostly North-central Florida.

Sources: Brodo et al. 2001.



Phaeophyscia* and *Physciella (Shadow Lichen)

Description: Foliose. Lobes small (0.5-1.5 mm wide), loosely attached to bark. Olive to brown upper surface. White medulla. Soredia or apothecia present, never isidiate. Apothecia disk brown to black, the rim is the same color as the thallus. Spot tests negative, unless medulla is orange (K+ red/purple).

Range: Most species found only in the Florida Panhandle.

Notes: This genus is rare or under collected in the state.

Sources: Brodo et al. 2001; Harris 1995

1. Thallus sorediate; apothecia usually lacking..... 2

1. Thallus not sorediate; apothecia present; Panhandle..... ***Phaeophyscia ciliata***
Smooth shadow lichen



Phaeophyscia ciliata Photo: Sharnoff



Phaeophyscia ciliata
Photo: Jason Hollinger

2. Medulla white... 3

2. Med O->red; Panhandle..... ***Phaeophyscia rubropulchra*** Orange-cored shadow lichen



P. rubropulchra Photo: Pamela Hess



P. rubropulchra Photo: Jason Hollinger

3. Tips of lobes naked 4

3. Tips of lobes with erect, colorless hairs; St. Johns County... ***Phaeophyscia hirsuta***
 .syn: *Phaeophyscia cernohorskyi* Hairy shadow lichen



P. hirsuta Photo: Pamela Hess



P. hirsuta Photo: Jason Hollinger

4. Soralia capitate, borne on raised, lateral lobes; underside dark; Panhandle, mostly on ornamental trees and shrubs *Phaeophyscia pusilloides* Pompom shadow lichen

4. Soralia marginal; underside pale; Baker County *Physciella chloantha*
Green shadow lichen



P. pusilloides Photo: Sharnoff

P. pusilloides Photo: Troy McMullin



Physciella chloantha

P. chloantha close-up Both photos: Sharnoff

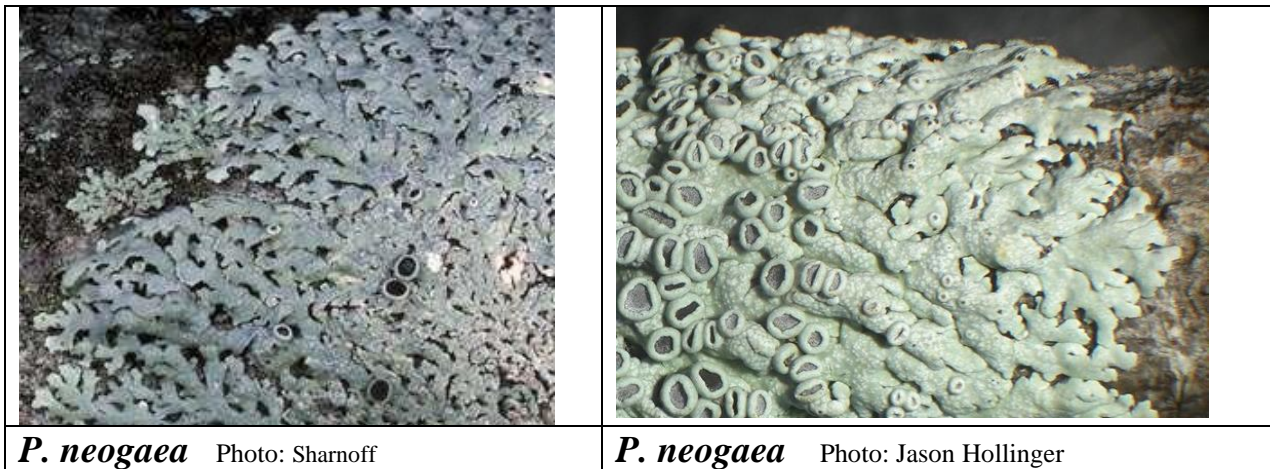
Physcia (Rosette Lichen)

Description: Foliose. Lobes small, tightly attached to the bark. Pale greenish gray upper surface. Lower surface brown to black. White medulla. Soredia or apothecia present. Never isidiate. Apothecia disk brown to black. Rhizines sparse to abundant. Medulla K+ yellow, or K-, KC-, C-. Unique features: **Cortex K+ yellow, small lobed (1-3 mm wide)**.

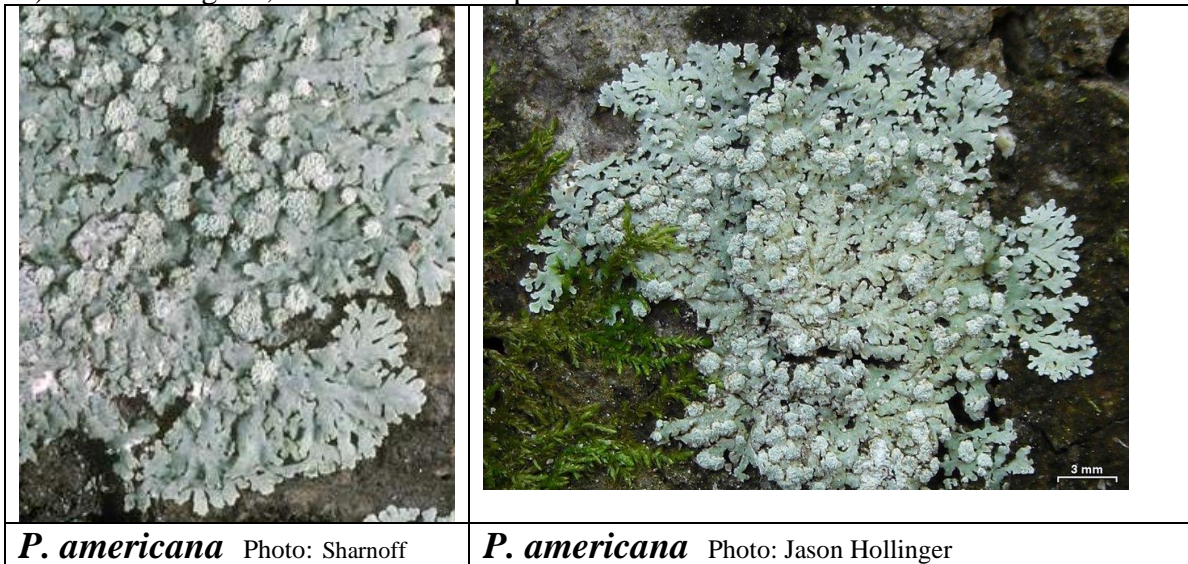
Range: Common throughout Florida. *Physcia americana* is restricted to north of Lake Okeechobee, while all other species are found throughout the state.

Sources: Brodo et al. 2001; Harris 1995.

- 1) Apothecia present, soredia absent..... *P. aipolia* complex, ***P. neogaea***, *P. pumilior*
(spores and spore types are needed to key these to the species level)
- 1) Apothecia absent, soredia present..... 2



- 2) Soralia laminal, underside pale..... ***P. americana*** Powdery rosette lichen
- 2) Soralia marginal, underside dark or pale..... 3



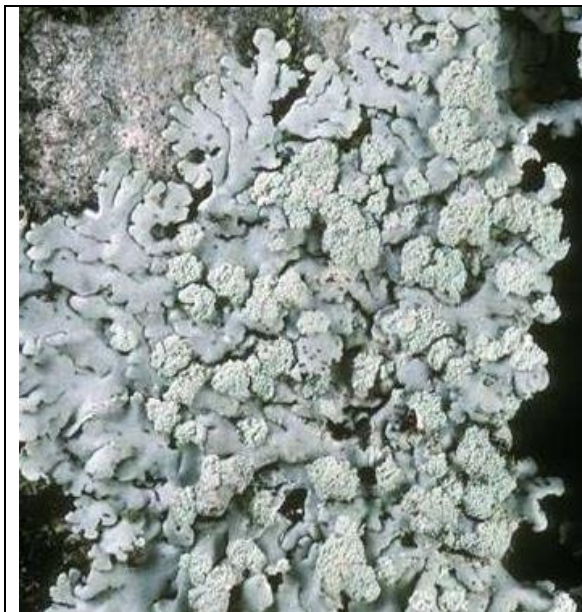
- 3) Underside pale at tips with dark longitudinal lines . *P. atrostriata* Streaked rosette lichen
 3) Underside dark, not striate..... *P. solediosa* Black-bottomed rosette lichen



P. atrostriata Photo: Pamela Hess



P. atrostriata Photo: Jason Hollinger

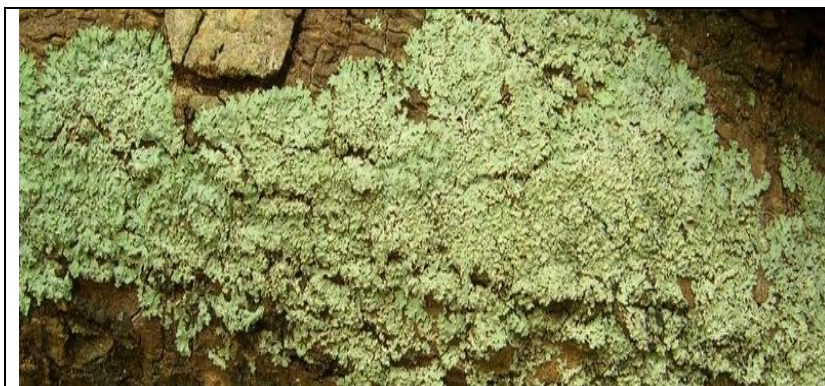


P. solediosa Photo: Sharnoff

Uncommon or rare species in Florida:

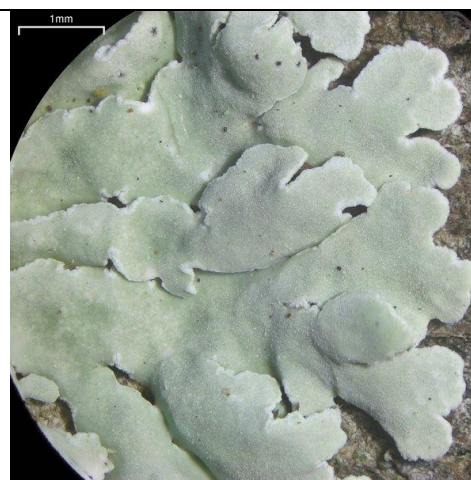
P. undulata- solediate, med K+ yellow, thallus not frosted- looking, thin and fragile.

P. crispa- solediate, med K-, thallus frosted-looking, thick.



P. crispa Both photos: Jason Hollinger

P. crispa



P. crispa sorediate, thallus thick, frosted-looking
Both photos: Jason Hollinger

P. crispa

Physma (Gelatinous Lichen)

Description: Foliose. Lobes medium, closely attached to the bark, edges adnate. Olive-green colored upper surface color. Thallus with **reticulate markings**, maculae, due to absence of photobiont. Apothecia large with very thick wrinkled margin. Lower surface tomentose. Ascospores simple.

Range: Citrus County, Near Floral City, and Alachua County at O'Leno State Park. Also a historic record from 1930 in Polk County, Faulkner's Hammock, near Bartow.

Notes: Only three records for Florida, but it is probably more common.

Sources: Harris 1995; Rosentreter et al. 2020.

Physma byrsaeum: Foliose, only gelatinous lichen with simple spores. Rare in Florida.



Physma byrsaeum Photo: Felix Schumm

Pseudocyphellaria (Specklebelly Lichen)

Description: *Pseudocyphellaria* is a genus of large, leafy lichens that are sometimes referred to as "specklebelly" lichens, since the underside of the thallus has spots or holes in the outer cortex. The genus has a widespread distribution, especially in southern temperate regions, and contains about 170 species. They resemble the genus *Lobaria*, except that most species of *Pseudocyphellaria* have conspicuous pseudocyphellae on their lower surface. Only one species of *Pseudocyphellaria* is known in Florida.

Pseudocyphellaria aurata Green specklebelly lichen

Foliose. With pseudocyphellae on the lower surface. Green, gray or brown. Soredia and medulla yellow. This is the only species known from Florida. No chemicals.

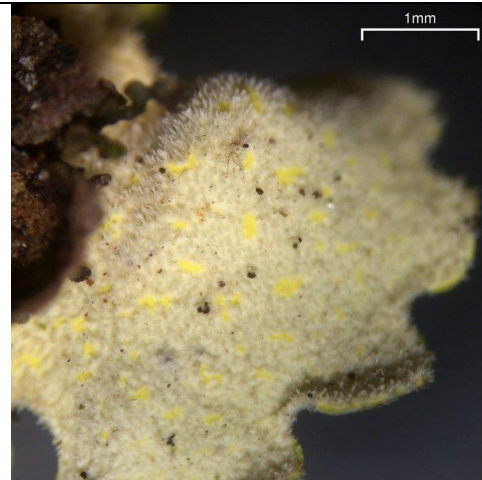
Range: The northern half of Florida.

Notes: Syn= *Crocodia aurata* (Ach.) Link

Sources: Brodo et al. 2001.



P. aurata Photo: Sharnoff



P. aurata Photo: Jason Hollinger
lower surface shows the pseudocyphellae

Pseudoparmelia (Lemon-lime Lichen)

Description: Foliose. Lobes small to medium, closely attached to the bark. Upper surface gray to green yellow, smooth and shiny. Usually fertile with many brown, bowl-shaped apothecia 1-4 mm in diameter. Apothecia present with spherical colorless spores. Never isidiate or sorediate. Non-ciliate. Spot tests various. Unique features: **Thallus lemon-lime color when moist.**

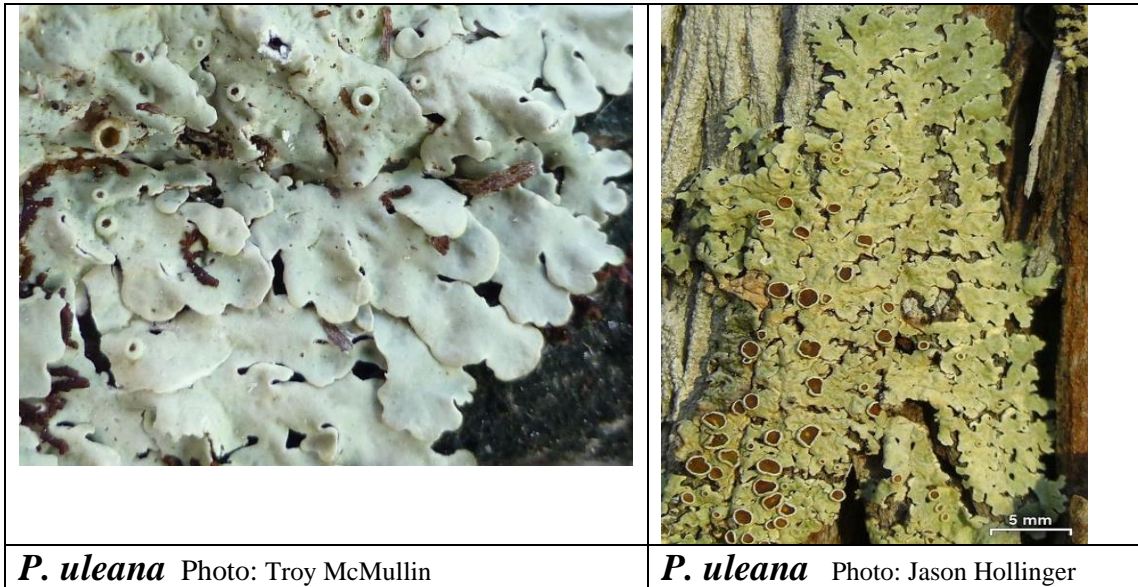
Range: Throughout Florida.

Notes: All three species have been collected in Everglades National Park, but the genus is uncommon to infrequent throughout Florida. Chemical testing (PD) is the most reliable way to differentiate species. Lobes resemble *Lobaria* species on the upper surface (see notes under *Lobaria*). All three species look similar in the field and require chemical tests. Therefore, we show pictures only for the most common species, *P. uleana*.

Sources: Brodo et al. 2001; Elix & Nash 1997.

Key:

- 1) Medulla PD-, K-, KC+ orange or yellow, most common species ... *P. uleana*
Common lemon-lime lichen
- 1) Medulla PD+ yellow orange to orange, K+ red or yellow.....2



- 2) PD+ yellow-orange, K+ yellow, dark red... *P. floridensis* Florida lemon-lime lichen
- 2) PD+ orange, K+ yellow.....*P. cubensis* Cuban lemon-lime lichen

No picture of these last two species since they are chemically different, but look similar to *P. uleana*.

Punctelia (Speckled Shield Lichen)

Description: Foliose. Lobes medium, loosely attached to the bark, edges adnate to rolling back and not attached. Gray-green colored upper surface color. Medulla white. Lower surface brown or black. Isidia present, occasionally branched; never sorediate. Rhizines present unbranched or forked. Spot tests various. Unique feature(s): The white spots of punctelia on the upper surface of the thallus.

Punctelia rudecta Rough-speckled shield lichen

Foliose. White cyphellae (punctelia) present on upper cortex, often near lobe tips, isidiate, medulla C+ red (lecanoric acid).

Range: Throughout Florida, but infrequent.

Sources: Brodo et al. 2001.



P. rudecta Photo: Troy McMullin



P. rudecta Photo: Sharnoff
Note the white spots – punctelia

Pyxine (Buttoned Rosette Lichen)

Description: Foliose. Lobes small (0.5-1.5 mm wide), tightly attached to bark. Gray to greenish upper surface. Medulla white, yellow, or pale orange to salmon. Apothecia or soredia present, never isidiate. Apothecia black, with black rim. Spot tests various, **K+ yellow or purple** or K-. Upper cortex sometimes UV+ yellow or UV-.

Unique features: Apothecia distinctive, **only small lobed genera without a green apothecia rim. Upper cortex UV+ yellow or UV-**. Thallus lobes are narrow and less fused than in the genus *Dirinaria*.

Range: Throughout Florida.

Sources: Brodo et al. 2001; Harris 1995.

- 1)Thallus UV-, dactyls isidiate/pustulate, marginal, breaking down into soredia
 ***P. eschweileri*** UV- Buttoned rosette lichen
- 1) Thallus UV+ yellow..... 2

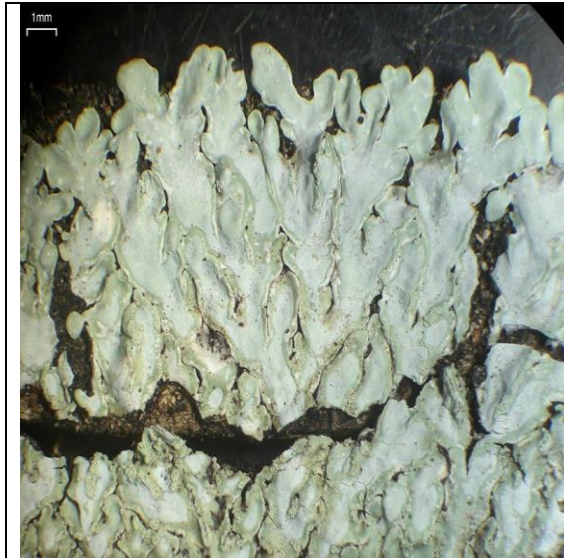


P. eschweileri

Both photos: Jason Hollinger

P. eschweileri

- 2) Medulla white, K+ yellow or K-..... ***P. cocoes*** UV+ Buttoned rosette lichen
- 2) Medulla orange to pale salmon, K+ purple..... ***P. caesiopruinosa***
 Orange buttoned rosette lichen



P. cocoes Both photos: Jason Hollinger

P. cocoes



P. caesiopruinosa

Both photos: Jason Hollinger

P. caesiopruinosa

Uncommon or rare species in Florida:

P. albovirens- not reported by Harris (taxonomic status uncertain)

P. berteriana- Tropical/subtropical, south of Lake Okeechobee

P. coralligera- NIS, Panhandle

P. soredata- Panhandle lichen, Harris himself saw no specimens

P. subcinerea-wide soredia marginal, UV-

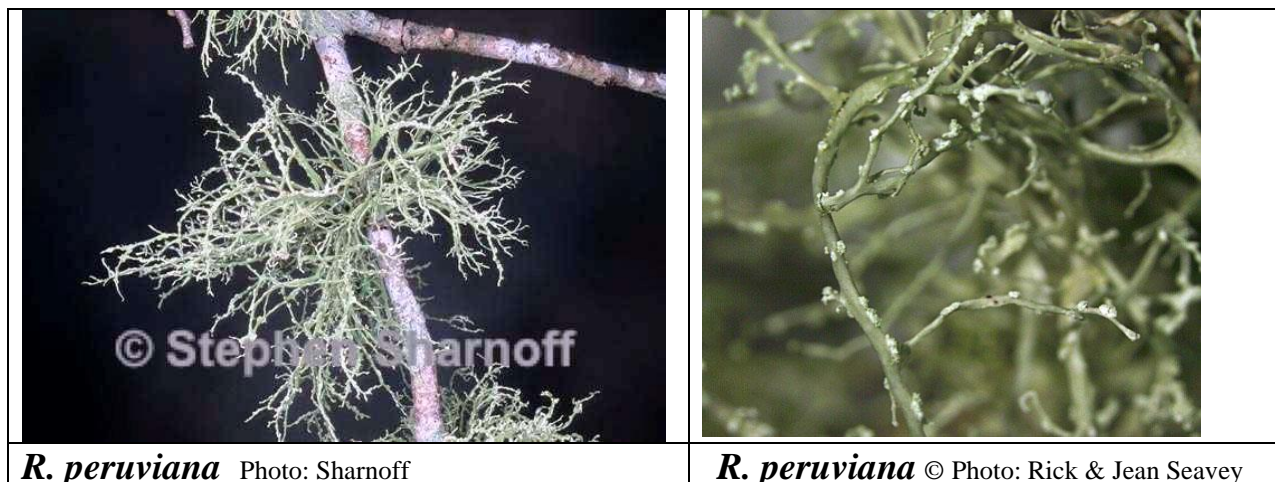
Ramalina (Ramalina)

Description: Fruticose. **Flattened to slightly rounded branches.** Pendant or shrubby. Yellowish green upper surface. White medulla. Soredia or apothecia present, never isidiate. Spot tests various (hard to determine because medulla is very thin). Unique features: Often with white lines (pseudocyphellae).

Range: Throughout Florida.

Notes: Species listed in the key are common and found throughout Florida. *Ramalina peruviana* and *R. usnea* are subtropical and their range is restricted to South Florida. There may be disjunct populations of more tropical lichens around the state (perhaps in areas of high humidity). For example, a specimen of *R. dendriscooides* was collected at Paynes Prairie State Park, in north-central Florida, a disjunct from the southern part of the state (Scott LaGreca, personal communication).

Sources: Brodo et al. 2001; Rosentreter et al. 2020; Concepcion 1972; Scott LaGreca personal communication.



- 1a) With soredia, apothecia not present..... ***R. peruviana***
- 1b) Without soredia, or soredia infrequent on the tips of the lobes, apothecia present, or occasionally lacking..... 2
- 2a) Branches long and pendant, large white striations on the branches, resembling an *Usnea*, species occasionally sorediate on the tips of small lobes..... 3
- 2b) Branches shrubby or pendant, with or without white striations..... 4
- 3a) Medulla K+ red, spores ellipsoid, rarely collected..... ***R. dasypoga***
- 3b) Medulla K-, spores fusiform ***R. usnea*** (syn = *R. usneoides*)



R. dasyposa Photo: Jason Hollinger



R. usnea Photos: A. DeBolt



- 4a) Branches smooth..... 5
- 4b) Branches bumpy with raised white marks or ridges or depressions..... 6
- 5a) Lobe tips flattened, branches fairly even in width, fusiform spores.....
 ***R. stenospora*** Southern strap
- 5b) Lobe tips round, white striations common... ***R. montagnei*** Striped ramalina (these 2 intergrade)
- 6a) Apothecia on the branch surface or margins, bumps are abundant, K- ***R. complanata***
 Bumpy ramalina
- 6b) Apothecia on or close to the tips of the branches 7



R. stenospora
 All 3 Photos: Sharnoff



R. montagnei






R. complanata

7a) Branches with depressions and ridges or long grooves, but without tubercles, Med K-
 ***R. americana*** Sinewed ramalina
 (specimens with a certain chemistry are referred to as ***R. culbersoniorum***)

7b) Branches with small white (bumps) tubercles or papillae, Med K+ red 8

8a) Spiny perpendicular branches usually present, although they may be sparse, small
 thalli, ellipsoid spores, Med Pd+ red or yellow, C- ***R. willeyi*** Thorny ramalina

8b) Spiny perpendicular branches absent, fusiform spores, Med Pd-, C+ pink to red
 (rapidly disappearing), found mostly on *Taxodium* trees..... ***R. paludosa*** Warty ramalina

		
<p><i>R. americana</i> Photo: Sharnoff</p>	<p><i>R. willeyi</i> Photo: Sharnoff</p>	<p><i>R. paludosa</i> Photo: Jason Hollinger</p>

Uncommon or rare species in Florida:

R. dendriscoides - sorediate and pendant.

R. denticulata - chemical variant of *R. complanata*; lobes are longer, more strap-shaped and not as heavily ridged.



R. dendriscoides

R. dendriscoides Both photos: Jason Hollinger

Uncommon or rare species known **only** from Everglades National Park: no photos.

R. leptosperma - Shrubby growth form, to 6 cm high, branches linear dictotomous canaliculate, lobes bifid compressed, no soredia, Med K+yel->red, norstictic acid, P+yel, C-, surface not papillate.

R. solediantha – a sorediate species with a shrubby growth form, apothecia scattered on the thallus but mostly marginal. Lobe tips sorediate and dichotomous forked, Med K+ yel->red, P+yel-> orange, atranorin and salazinic.

R. subpellucida -Thallus 1-3 cm high with a shrubby growth form, pointed lobe tips, lobes terete, surface longitudinally striate, apothecia numerous, terminal to subterminal, no papillae, Med minus for all spot tests, only divaricatic acid, Spores septae and fusiform 16-22 x 3-5 u.

Relicina (Eyelash Lichen)

Description: This genus is unique in that it has **bulbate cilia** on the lobe margins, and it produces usnic acid in the cortex. Most species are closely adnate and usually collected still attached to the bark. None have ascending lobes. This genus is extremely uniform in lobation. The lobes are generally narrow and sublinear, dichotomously branched, and contiguous. Small marginal lobules often develop. The **lower surface is either black** through carbonization or medium to very pale.

Relicina

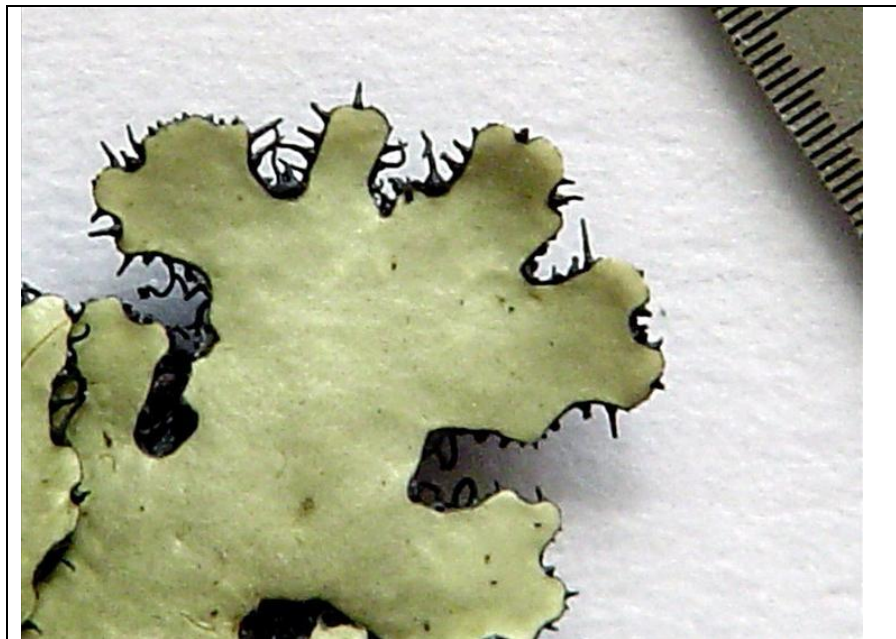
Foliose. Upper cortex yellow green. **Cilia swollen at base**. Rarely collected in Florida. Two species known are *R. abtrusa* (from N. Florida and Georgia) and *R. eximbricata* (Florida Keys).

Range: Both species are rare in Florida and *R. eximbricata* is only known from the Florida Keys.

Sources: Brodo et al. 2001.

Key:

- 1.a Thallus isidiate, Medulla K+red, containing norstictic acid, Northern Florida ***R. abtrusa***
- 1.b Thallus not isidiate or soreciate, Medulla K- or brownish, Pd+ red, containing fumarprotocetraric acid, Florida Keys ***R. eximbricata***



Relicina abtrusa Photo: Spielmann



R. eximbricata
Photo: Sharnoff



R. eximbricata Photo: Jason Hollinger Note bulbate cilia

Sticta (Moon Lichen)

Description: Foliose. Lobes small to large, loosely attached to bark or moss. Dark brown to gray-brown upper surface. White medulla. **Isidia present (coralloid and often in crack, or phyllidiate on lobe edges)**, never apothecia or soredia. Spot tests negative, no lichen chemicals. Unique features: **Fuzzy tomentose** and **white cyphellae** present on lower surface. This is the only genera with white cyphellae in Florida.

Range: Throughout Florida.

Notes: The range of these taxa is unknown. *Sticta beauvoisii* was collected in Fakahatchee Strand Preserve, but seems to be rare south of Lake Okeechobee and uncommon further north. *Sticta weigeli*, closely resembles *S. beauvoisii*, but is not currently listed on the North American Lichen Checklist (Version 17). *Sticta weigeli* has a K+ purple medulla, while the medulla of *S. beauvoisii* is K-.

Sources: McDonald et al. 2003. Rosentreter et al. 2020.

Key:

- 1) Isidia coralloid, branched, laminal, often emerging from cracks..... *S. beauvoisii*
Fringed moon lichen
- 1) Isidia phyllidiate (flattened and sticking out off of lobes)..... 2
- 2) Medulla K+ red, yellow, or purple, PD+ orange..... *S. fragilinata* Fragile moon lichen
- 2) Medulla K-, PD-..... *S. carolinensis* Carolina moon lichen



S. beauvoisii Both photos: Sharnoff

S. fragilinata



S. carolinensis Photo: Jason Hollinger

Teloschistes (Orange Bush Lichen)

Description: *Teloschistes* is a genus of lichens in the family Teloschistaceae. It was circumscribed by Norwegian botanist Johannes Musaeus Norman in 1852. The name of the genus means "split ends". The genus generally contains some orange pigments on a slender lobed thallus.

Teloschistes exilis

Fruticose. **Cortex orange.** Apothecia common, thallus non-isidiate, non-sorediate. Apothecia margins without cilia. *Teloschistes flavicans*, also known as the Golden Hair Lichen, is a lichenized species of fungus in the genus *Teloschistes*. Recognized by its saffron-colored pigmentation, this species grows on rocks and branches of trees.

Range: Northern Florida.

Notes: Infrequent in Florida, expected to be more common.

Sources: Brodo et al. 2001.



Teloschistes exilis Photo: Sharnoff



Teloschistes exilis Photo: Jason Hollinger

Tuckermanella (Wrinkle Lichen)

Description: Small brown to olive foliose lichens with lobes only 1-4 mm wide. Often ascending and ruffled, with sparse rhizines, but sometimes with marginal cilia. Pseudocyphellae sparse. Photobiont green (*Trebouxia*). Apothecia lecanorine, with shiny brown disks, produced on the underside of the reflexed lobe margins. Pycnidia on the lobe margins, generally black and prominent. Mostly on bark or wood (fence posts). Often on the smaller branches or twigs of conifers.

Tuckermanella fendleri Dwarf wrinkle lichen

Foliose to fruticose, more erect than prostrate. Greenish-brown when moist. **Brown when dry**, usually flat, relatively large apothecia. Pseudocyphellae abundant and conspicuous. Apothecia on the lobe surface.

Range: Throughout Florida.

Notes: syn= *Cetraria*, *Tuckermannopsis fendleri*.

Sources: Brodo et al. 2001; DeBolt et al. 2007.



Tuckermanella fendleri - moist

Photo: Sharnoff



Tuckermanella fendleri - dry

Photo: Jason Hollinger

Usnea (Beard Lichen)

Description: Fruticose. Pendant or shrubby. Lobes long and slender. Attached to bark at one central location. Yellowish green upper surface or reddish (in 1 species). Apothecia, soredia or isidia present. Often sorediate becoming isidiate, or spiky soredia. Spot tests various. Unique features: **Often with perpendicular branches. Apothecia larger than apothecia of *Ramalina* species. With a white, pink or red central cord** (scrape cortex off).

Range: Throughout Florida

Notes: *Usnea strigosa* is very common and found throughout Florida.

Sources: Brodo et al. 2001; Harris 1995.

Key:

1) Cortex, medulla or axis not red or pink....2

1) Cortex, medulla or axis red or pink...4

2) Soredia and isidia absent, NIS, thallus long, pendant, axis brownish.... *U. trichodea*

Bony beard lichen

2) Soredia and or isidia present.....3

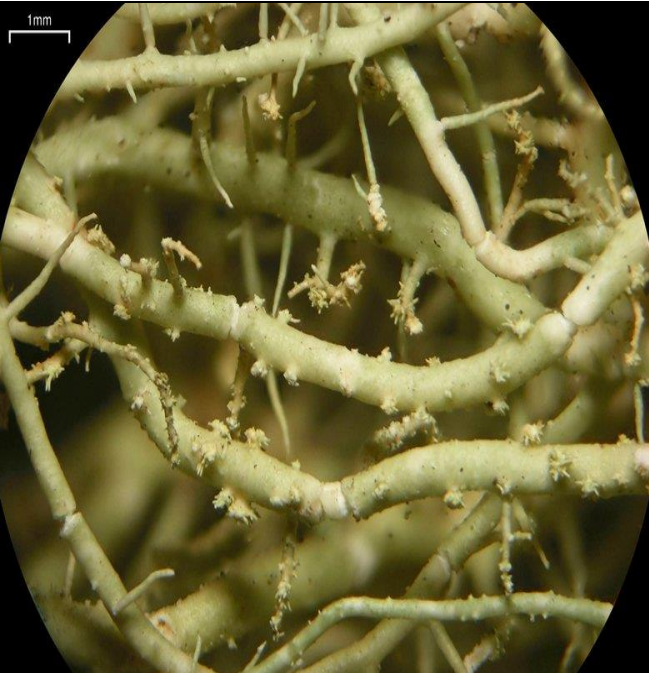


U. trichodea Photo: Sharnoff

U. trichodea Photo: Jason Hollinger

3) Thallus pendant, often with numerous perpendicular branchlets, isidiate soredia on the tips*U. dimorpha*

3) Thallus shrubby, medulla compact, isidiate-sorediate..... *U. subscabrosa*
 Horny beard lichen



U. dimorpha Photo: Sharnoff

U. dimorpha Photo: Jason Hollinger

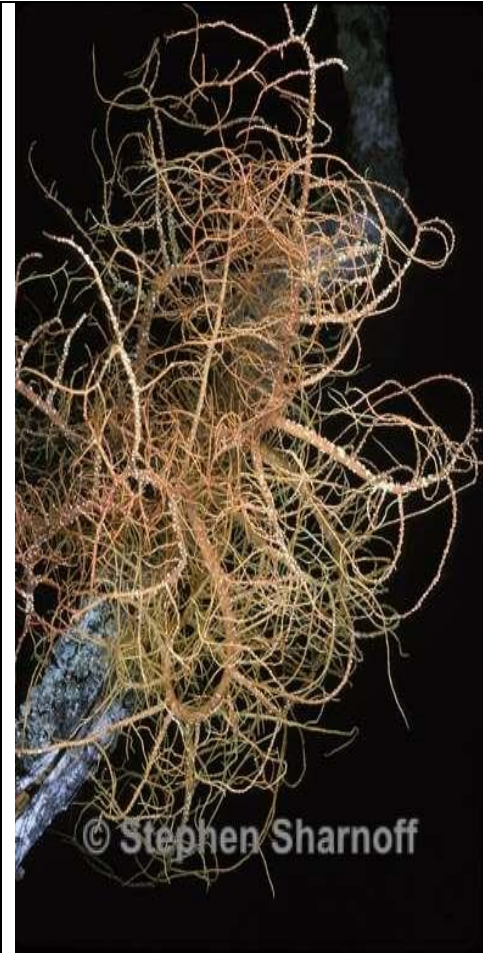


U. subscabrosa Photo: Sharnoff

U. subscabrosa Photo: Jason Hollinger

4) Cortex not red, but the medulla or axis is red to pink...5

4) Cortex mottled **red**, medulla not pigmented, shrubby to sub-pendant, isidiate or isidiate-sorediate *U. rubicunda* Red beard lichen



U. rubicunda Photo: Sharnoff



U. rubicunda Photo: Jason Hollinger

- 5) Main axis hollow in x-section to examine.....6
- 5) Main axes solid.....7

- 6) Medulla red, **K+** red, UV- (norstictic), sorediate-isidiate... *U. baileyi* Hollow beard lichen
- 6) Medulla pink, **K-**, UV+ (diffractaic), isidiate-sorediate... *U. perplectata* Hollow beard lichen



U. baileyi Photo: Sharnoff



U. baileyi Photo: Pamela Hess Note red medulla



U. perplectata Photo: Sharnoff



U. perplectata Photo: Pamela Hess

7) Thallus shrubby to pendant w/o numerous perpendicular branchlets, apothecia rare..8

7) Thallus shrubby with numerous perpendicular branchlets, main branches often ending in apothecia, NIS. *U. strigosa* Bushy beard lichen

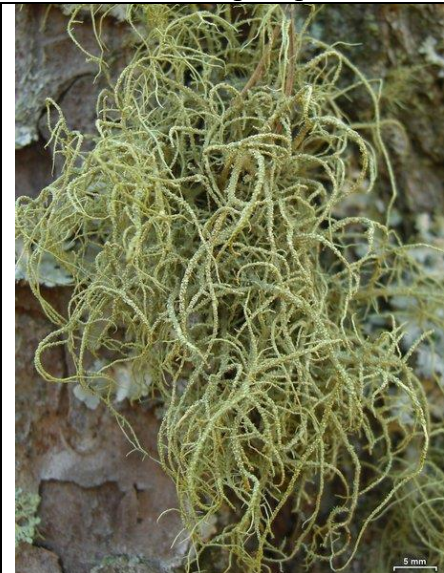


U. strigosa Photo: Sharnoff



U. strigosa Photo: Jason Hollinger

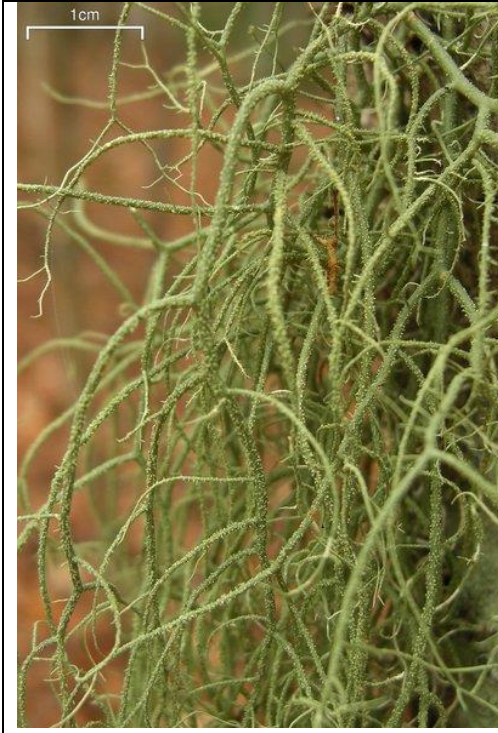
8. Axis reddish, **isidia abundant** *U. mutabilis* Bloody beard lichen
 8. Axis unpigmented, **warts** on surface looking similar to soredia but they are not soredia, medulla pale pink branches often coarse..... *U. ceratina* Warty beard lichen



U. mutabilis



U. mutabilis Both photos: Jason Hollinger



U. ceratina Both photos: Jason Hollinger

U. ceratina

Additional uncommon or rare species in Florida

U. endochrysea: Similar to *U. strigosa*. *U. endochrysea* has larger ascospores (9-12 μm) than *U. strigosa* (7-9 μm).

Usnea evansii: Probably common along the coast except in the extreme south.

U. michauxii, Rare and coastal, mainly in the northern counties.

U. pensylvanica: Similar to *U. rubicunda*. They differ in chemistry. Inner medulla is K+ yellow to red, and outer medulla is K-. *Usnea rubicunda* is medulla K+ red, and P+ yellow. At the basal portion. They also differ in basal color (green in *U. rubicunda* and red in *U. pensylvanica*), and cracks (*U. rubicunda* cracked while *U. pensylvanica* isn't cracked). It may be in Florida?

Vulpicida (Sunshine Lichen)

Description: *Vulpicida* is a genus of lichenized fungi in the family Parmeliaceae. Circumscribed in 1993 to contain species formerly placed in *Cetraria*, the genus is widespread in Arctic to northern temperate regions and contains six species. The genus is characterized by the presence of the secondary metabolites pulvinic acid and vulpinic acid, compounds that when combined with usnic acid give the species their characteristic **yellow and green colors**.

Vulpicida viridis Hidden Sunshine Lichen

Foliose. Yellowish, orange or gray green. Apothecia present, brown. NIS.

Range: Panhandle of Florida.

Notes: One collection from the Everglades is either disjunct or mis-identified.

Sources: Brodo et al. 2001.



Vulpicida viridis Photo: Sharnoff



Vulpicida viridis Photo: Jason Hollinger

Xanthoparmelia (Rock Shield Lichen)

Description: Thallus foliose, adnate to loosely adnate, 4-12 cm in diam, irregularly lobate lobes, elongate, plane to subconvex, often black-rimmed, separate, contiguous to somewhat imbricate, (0.5-)1-3 mm wide. Apices subrotund to subtruncate, smooth to crenate. Eciliate upper surface **yellow-green**, smooth, **shiny**, epruinose and emaculate. Tips syncorticate, dull brown to black. Soralia or pustulate medulla white, with continuous algal layer. Lower surface black, plane, moderately to densely rhizinate.

Substrate and ecology: On acidic rocks, rarely on wood, often in open, arid habitats but also in more shaded, forested habitats.

Xanthoparmelia conspersa

Foliose, on rock. Medulla K+ yellow to red, **isidiate**, lower side black. This is the only species of *Xanthoparmelia* known in Florida.

Range: North and central Florida on rock. There are only four known sites for this lichen in Florida.

Notes: Exposed rock in the open sun. Uncommon.

Sources: Brodo et al. 2001.



Xanthoparmelia conspersa

Photo: Sharnoff



Xanthoparmelia conspersa

Photo: Jason Hollinger close-up - isidia visible

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