

Common lichens of the Natural Area Teaching Laboratory

Barry Kaminsky

Graduate Student, Department of Biology

Below is a non-technical key to the common lichens at the Natural Area Teaching Laboratory (NATL) located on the University of Florida campus. All habitats at NTL including the upland *Pinus*, xeric hardwood forest, and the seasonally flooded forest located near Archer Road were all surveyed. This key includes the most common species, however additional species (and potentially very similar looking species) may be present, especially in the genera *Dirinaria*, *Parmotrema*, and *Physcia*.

A few specimens require a UV light or a “K” test, which is a 10% KOH solution. For the test, simply place a small, small drop (could use a toothpick) on the specified layer of the layer. Note different layers of the lichen could contain different chemicals so be sure to apply KOH on only the specified layer.

As a courtesy, if you are collecting lichens or any biological specimens for class or research be sure to collect off the trail!

- 1a) Lichen is crustose (tightly adhered to the bark) and lacking distinct lobes Key 1
- 1b) Lichen is fruticose (either pendant or erect, not leafy), or in one genus a central erect structure with numerous squamules.... Key 2
- 1c) Lichen is foliose (leafy or having lobes)..... Key 3

Key 1: Crustose Lichens

1a) Upper cortex is white and smooth with distinct bright red patches, isidia-like structures are bright red... *Herpothallon rubrocinctum* (syn: *Cryptothecia rubrocincta*)

1b) Upper cortex lacking reddish color... 2

2a) Lichen is yellowish green or yellow, consisting of granular sorediate masses... 3

2b) Lichen not as above... 4

3a) Lichen is bright yellow and consists of granular sorediate masses, usually on *Pinus*... *Chrysothrix* sp.

3) Lichen is yellowish green, on hardwood trees in seasonally flooded swamps.... *Lecanora floridula*

4) Lichen is white to greenish, with script-like apothecia, small lichen usually up to 6mm wide... *Graphis* sp.

4) Lichen is white to bluish green, lacking elevated script-like apothecia, large lichen 6mm and larger, circular... *Cryptothecia striata*

Key 2: Fruticose Lichens

1a) Lichen growing on ground or *Pinus* or *Sabal* palm, consists of a central podetia and numerous small squamules... *Cladonia didyma*

1b) Lichen growing in canopy or branches higher up on a tree, lacking a podetia... 2

2a) Branches cylindrical, apothecia large and flat with numerous branchlets around the edge, when a branch is pulled apart, a central pinkish colored cord is present... *Usnea strigosa*

2b) Branches flattened, often with white striations on branches, apothecia small and lacking branchlets, no central colored cord... *Ramalina montagnei*

Key 3: Foliose Lichens

1a) Lichen grayish to blackish, when wet lichen is gelatinous (jelly-like)... 2

1b) Lichen a shade of green, not gelatinous when wet... 5

2a) Lichen has numerous small orange to red colored apothecia (2 mm wide), isidia located at the tips of the apothecia, thallus with wrinkles (visible with hand lens)... *Leptogium marginellum*

2b) Apothecia rarely present, isidia present and not associated with apothecia, thallus wrinkled or not... 3

3a) Lichen distinctly wrinkled (visible without a hand lens), wrinkles longitudinal (flowing towards lobe tips), isidia numerous and usually on ridges, isidia occasionally so thick can't see ridges... *Leptogium isidiosellum*

3b) Wrinkles absent or if present not flowing towards lobe tips and usually only visible with a hand lens... 4

4a) Wrinkles not present... *Leptogium cyanescens*

4b) Wrinkles present... *Leptogium austroamericanum*

5) Lichen with sexual reproductive structures (apothecia), lacking isidia or soredia... 6

5b) Lichen primarily with asexual reproductive structures (isidia or soredia), rarely containing both asexual and sexual structures... 7

6a) Lichen with small lobes that are tightly adhered to the bark, underside lacking rhizines (root-like structures), apothecia flat... *Dirinaria picta*

6b) Lichen with large lobes that aren't tightly adhered to the bark, underside with rhizines, apothecia cupped shaped with a perforation (a hole) in the middle... *Parmotrema perforatum* complex (*Parmotrema perforatum*, *P. submarginale*, *P. subrigidum*)

7a) Lichen with isidia, soredia not present... 8

7b) Lichen with soredia, isidia not present... 11

8a) Lichen is gray to greenish-gray with large lobes (always over 6 mm wide) that often appear wavy, lobe tips not attached to substrate... *Parmotrema tinctorum*

8b) Lichen is green to yellowish green, lobes up to 6mm wide, lichen is more flat though ends not attached to the substrate... 9

9a) Lichen with cilia (hairs) on the side of the thallus, cilia may easily break off but the bulbate or swollen base (located on the edge of the lichen) is still present in the lichen, medulla K+ red...

Bulbothrix isidiza

9b) Lichen lacking cilia, medulla K-... 10

10a) Lichen has strong white maculation (stripes) especially on lobe tips, lower side with a brown margin at lobe tips... *Canoparmelia caroliniana*

10b) Lichen lacks white maculation, lower side with a black margin at lobe tips... *Canoparmelia amazonica*

11a) Large lichen (greater than 4 mm wide), lobe tips usually upturned or wavy, contains large cracks on the upper surface, soredia circular and located on the lobe tips... *Parmotrema reticulatum*

11b) Lichen does not contain all of the above characteristics... 12

12a) Soredia is pustulate, or grouped together in a circular formation... 13

12b) Soredia is linear, or resembling a line usually along the lobe tips... 16

13a) Soredia on raised lobes... *Canoparmelia cryptochlorophaea*

13b) Soredia not on raised lobes... 14

14a) Lower side of lobe tips is entirely black or brown... *Canoparmelia texana*

14b) Lower side of lobe tips is white or gray... 15

15a) Lower side of lobe tips white, older parts of lower side pitch black, medulla is white...

Physcia solediosa

15b) Lower side of lobe tip is gray to white, older parts of lower side grayish to blackish, medulla faintly orangish... *Pyxine eschweileri*

16a) Underside white to tan, rhizines whitish... *Heterodermia albicans*

16b) Underside brown to black, rhizines black... 17

17a) Lobes broad, sparse cilia present, medulla UV+ blue... *Parmotrema rampoddense*

17b) Lobes broad or narrow, cilia not present, medulla UV-... *Parmotrema cristiferum* complex (4 species) (see below key)

All four species listed below are probably present at NATL. Chemical tests are the most reliable characteristic to tell these 4 species apart. However some require a probable carcinogenic compound, paraphenylenediamine (P test).

Parmotrema cristiferum complex:

1a) Lobe edge of the underside is white... 2

1b) Lobe edge of the underside is brown to black... 3

2a) Medulla is K-, P-... *Parmotrema praesorediosum*

2b) Medulla is K+ yellow faintly, P+ red to orange... *Parmotrema dilatatum*

3a) Medulla is K+ yellow to red, P+ orange... *Parmotrema cristiferum*

3b) Medulla is K-, P+ red to orange... *Parmotrema gardneri*

Additional sources:

Brodo I. M., Sharnoff S.D. and Sharnoff S. 2001. Lichens of North America. Yale University Press, New Haven & London. 795 pages.

Consortium of North American Lichen Herbaria. <http://lichenportal.org/portal/>

DeBolt A., Rosentreter R. and Martin E.P. 2007. Macrolichen diversity in subtropical forests of north-central Florida. *The Bryologist* 110: 254–265.

Griffin III, D. Unpublished report. Keys to the common filamentous & macrolichens of Florida: Entry keys to families, genera & certain species.

Harris R. C. 1995. More Florida Lichens. Published by the author. Bronx, New York.

Rosentreter, R., DeBolt, A. and Kaminsky B. Field oriented keys to the Florida lichens.
Unpublished.

Lichen Descriptions (arranged alphabetically)

Bulbothrix isidiza

Habitat: In NATL, this species is found on *Pinus* bark in the hydric forest. It may also be present in the mesic forest.

Key Characteristics: This species has bulbate cilia (meaning base of cilia is swollen or enlarged). However often this is not readily seen because the cilia are fragile. The bulbate base is often only present. The lobe margin has a brownish tint which helps to narrow it down to *Bulbothrix* or *Canoparmelia*. The lobe shape is different between the two: *Bulbothrix* has more curves to its edge. There are 4 species of *Bulbothrix* in Florida.

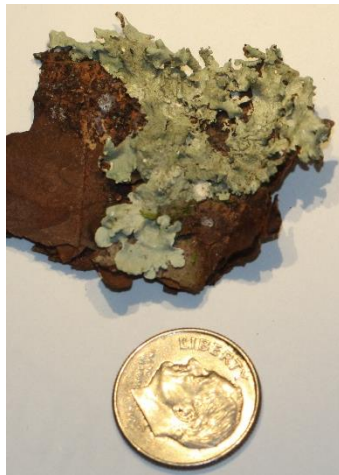


Canoparmelia amazonica

Habitat: In NATL, this species is found in upland mesic and xeric hardwood and *Pinus* forests and occasionally in the hydric forest.

Distinct characteristics: This species has isidia, a black lower surface that extends to the lobe tips. Also the thallus is not maculate and the medulla is KC+pink. *Canoparmelia salacinifera* looks similar but its medulla is K+ yellow turning to red. *Canoparmelia caroliniana* has maculae.

Cool Fact: Many species of lichens contain secondary chemicals, which are distinguishable by spot tests and thin layer chromatography. These chemicals are often important to delineate species.



Canoparmelia cryptochlorophaea

Habitat: In NATL, this species is common in upland mesic and xeric hardwood and *Pinus* forests and occasionally in the hydric forest.

Distinct characteristics: This species has granular or warty soredia on *raised portions* of the thallus. No other species has this characteristic. See *C. texana*, below which is also present at NATL.



Canoparmelia caroliniana

Habitat: In NATL, this species is common in upland mesic and xeric hardwood and *Pinus* forests and occasionally in the hydric forest.

Distinct characteristics: This species has isidia. The upper surface is strongly maculate while the lower surface is black brown to black. However the margin of the lower side (closer to the lobe tips) is pale brown.



Canoparmelia texana

Habitat: In NATL, this species is found in mesic and xeric hardwood forests.

Distinct characteristics: This species looks similar to other *Canoparmelia* species, especially *C. cryptochlorophaea*. However the soredia are not up raised portions of the lobe.



***Chrysothrix* sp.**

Habitat: In NATL, this species is found almost exclusively on *Pinus* in xeric habitats and is uncommon on hardwood trees.

Distinct characteristics: This is the only lichen genus in Florida that has like small sulphur yellow circular (sorediate) masses and lacks an outer cortex.

Cool Fact: Many members in this genus are not known to reproduce sexually. It's an enigma how these species survive.



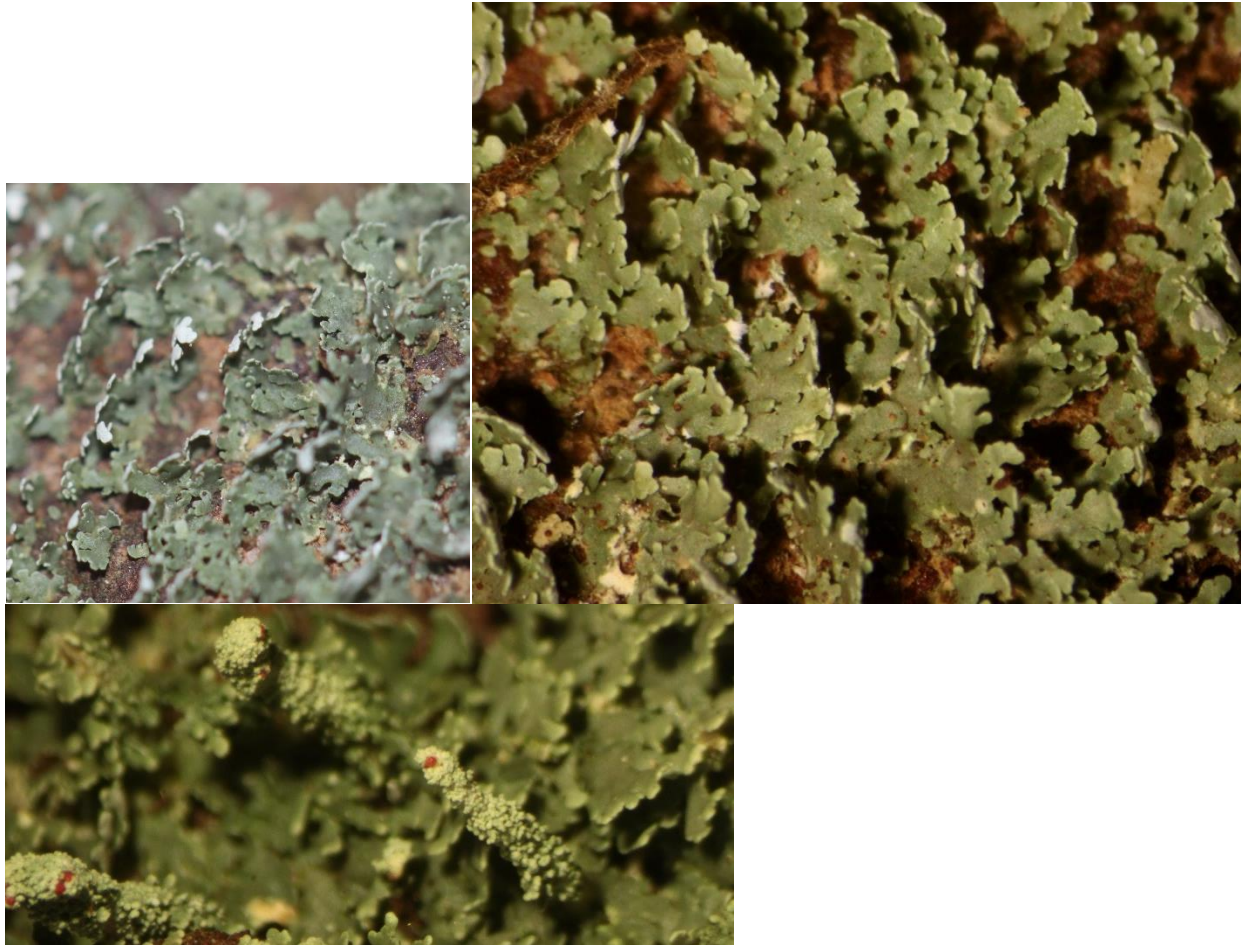
Cladonia didyma

Habitat: In NATL, this species is found in mesic and xeric hardwood forests growing on palm trees or slowly decaying dead wood.

Distinct characteristics: It is easy to identify *Cladonia* to genus, but difficult to identify to species. It is dependent on secondary chemicals and a range of morphological characteristics which may or may not be present in every specimen. There may be additional species of *Cladonia* at NATL.

Cool Fact: Some species of *Cladonia* are called reindeer moss, and are a winter subsistence food for reindeer and elk.

Notes:

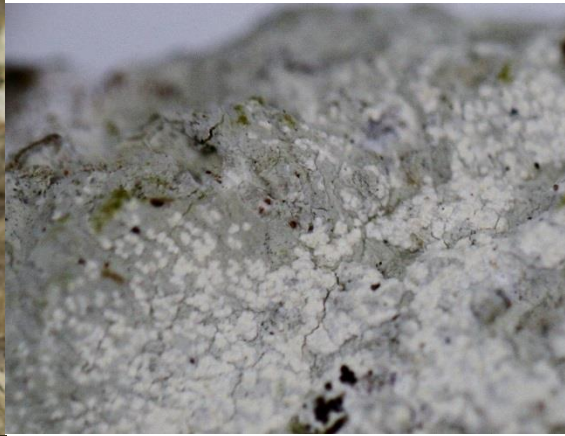
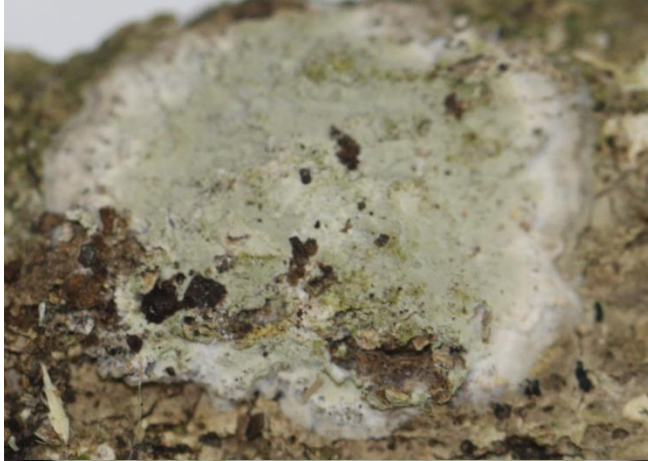


Cryptothecia striata

Habitat: In NATL, this species is found in xeric to hydric hardwood forests.

Distinct characteristics: This species is a white crustose lichen, with a white margin and slight greenish blue interior.

Cool Fact: This is one of the most common large crustose lichens at NATL.



Dirinaria picta

Habitat: In NATL, this species grows in xeric to hydric forests, and seems to prefer lots of sun. This species is common in NATL mesic and xeric forests, rare in hydric hardwood forests.

Key Characteristics: This species has soredia masses that are circular (pustulate) in shape. The species lacks rhizines (root like structures on the lower side). Also the lower side is entirely black. Finally the medulla is UV+ blue/white. There are probably additional *Dirinaria* species in NATL.

Cool Fact: The black organism in this picture is a fungus attacking the lichen.



***Graphis* sp.**

Habitat: In NATL, this species is found in xeric to hydric hardwood forests.

Key Characteristics: This is a white crustose lichen, with large black like lirellae (modified apothecia) that resemble letters or lines. Note: this specimen looks greenish because the green algae is bleaching out.

Cool Fact: Scientists have found many new species in this genus, and there are most likely species new to Florida still to be found.



Heterodermia albicans

Habitat: In NATL, this species is found on branches of hardwood trees in the mesic and hydric forests.

Key Characteristics: This small foliose lichen can be difficult to distinguish from other small lichens. However it has white rhizines, and a white underside. Other small lobed lichens including *Physcia solediosa* and *Pyxine eschweileri* are at least partially black lower side. *Heterodermia albicans* also has a K+ yellow turning to red medulla while the other two species do not.



Herpothallon rubrocinctum (syn: *Cryptothecia rubrocincta*)

Habitat: In NATL, this species is found occasionally in mesic forests, and is common in hydric forests.

Key Characteristics: This crustose lichen with white edges and bright red. There are isidia like structures that are red.

Cool Fact: The common name of this distinct lichen is “Christmas lichen.”



Lecanora floridula

Habitat: In NATL, this species is found on hardwood trees only in the hydric forest.

Key Characteristics: This species is a granular crustose lichen similar to the *Chysothrix*, but with a yellowish green.

Cool Fact: Some lichen species, just like every organism on Earth, has a different niche. In NATL, this *Lecanora* species prefers to live in more hydric area.



Leptogium austroamericanum

Habitat: In NATL, this species is found in mesic and hydric hardwood forest.

Distinct characteristics: This lichen is gelatinous when wet, has isidia, weakly wrinkled (need at least 10x magnification to see wrinkles).

Cool Fact: A lichen is a symbiotic relationship between a fungus and cyanobacteria (a blue green algae). The chloroplasts in plants is very similar to a cyanobacteria, and the theory of endosymbiosis states that a cyanobacteria may be the cause of eukaryotes!



Leptogium cyanescens

Habitat: In NATL, this species is found in mesic and hydric hardwood forest

Distinct characteristics: This species is gelatinous when wet. It also has a smooth thallus that has no wrinkles. Isidia are cylindrical to flat, isidia laminal or marginal.

Cool Fact: This is the most common nitrogen fixing lichen east of the Mississippi River.



Leptogium isidiosellum

Habitat: In NATL, this species is found in mesic and hydric hardwood forests.

Distinct characteristics: This lichen is gelatinous when wet, has isidia, strongly wrinkled usually longitudinally (visible without hand lens), isidia often only on wrinkles.

Cool Fact: Most lichens have a green algal symbiont, but *Leptogium* species have a cyanobacteria in the genus *Nostoc*. As a result, these species are able to fix nitrogen!



Leptogium marginellum

Habitat: In NATL, this species is found in mesic and hydric forests.

Distinct characteristics: This species is gelatinous when wet, has a wrinkled thallus and has numerous small isidia only found on the edge of the apothecia.

Cool Fact: Lichens often serve as habitat for smaller organisms such as tardigrades and assassin bugs.



Parmotrema cristiferum complex

Habitat: In NATL, this species is found on branches of hardwood trees in the mesic and hydric forests.

Key Characteristics: This complex is the most common soresiate lichens in NATL. There are 4 species in the complex. The soresia are linear along the lobe margins. Cilia is not present in any species in this complex. Paraphenylenediamine is necessary to tell species apart.



Parmotrema perforatum (species complex)

Habitat: In NATL, this species is found on branches of hardwood trees and *Pinus* in the mesic and most likely hydric forests.

Key Characteristics: The large broad lobes, presence of dark cilia (hairs) on the lobe margins and apothecia with perforations are unique to this species complex. The perforations may initially be very small and in the center of the apothecia, but perforations are typically proportional to the apothecia size. There are three species in this complex, and the chemical paraphenylenediamine is needed to determine the species.

Cool Fact: The small black dots in the first photo are conidiomata (pycnidia), which are asexual fungal reproduction structures.



Parmotrema rampoddense

Habitat: In NATL, this species is found on branches of hardwood trees in the mesic and most likely hydric forests.

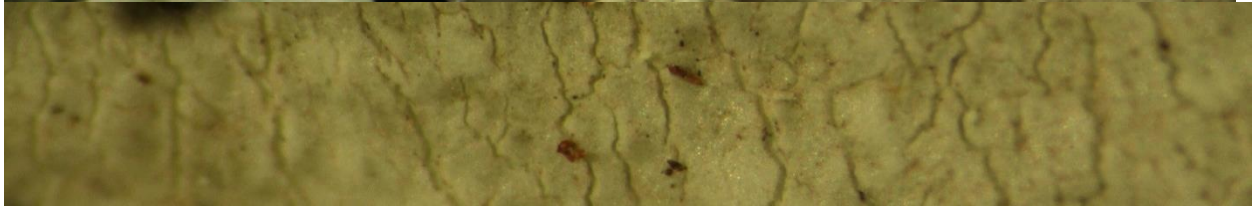
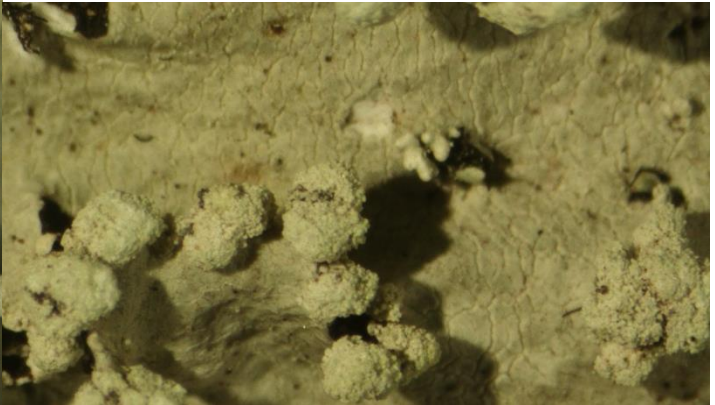
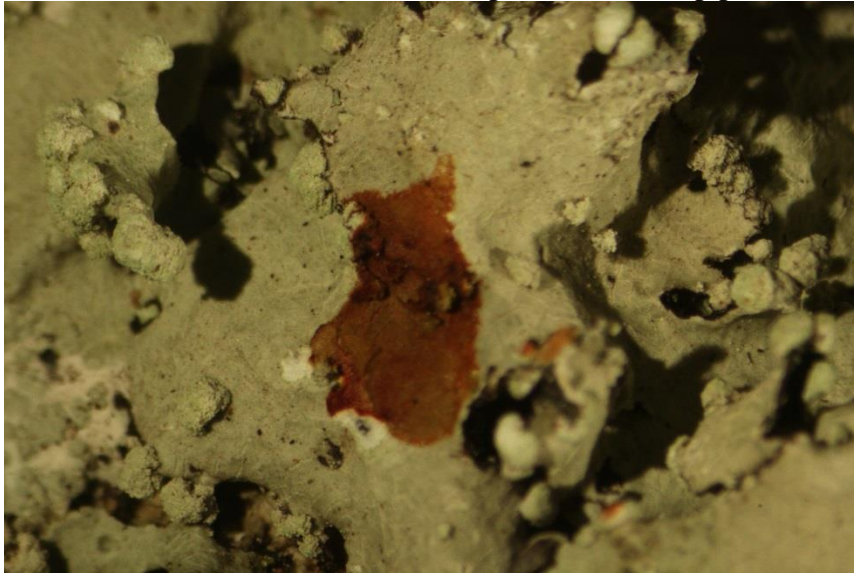
Key Characteristics: This species has large roundish lobes that are sparsely ciliate. It has soredia that are found linearly along the margins (they often appear wavy). This species looks like many other *Parmotrema* species, but this species has a UV+ bright blue medulla (see top picture).



Parmotrema reticulatum

Habitat: In NATL, this species is found on branches of hardwood trees in the mesic and most likely hydric forests.

Key Characteristics: This species looks similar to many other *Parmotrema* species, but it is the only species that has cilia, visible cracks in the cortex, maculae, and is sorediate. It also has soredia that are orbicular. Notice the K+ red spot test in the top picture.



***Parmotrema tinctorum*:**

Habitat: In NATL, this species is very common in upland mesic and xeric hardwood and *Pinus* forests and occasionally in hydric forests.

Distinct characteristics: This species is a large foliose lichen with light greenish gray thallus. Isidia are common.

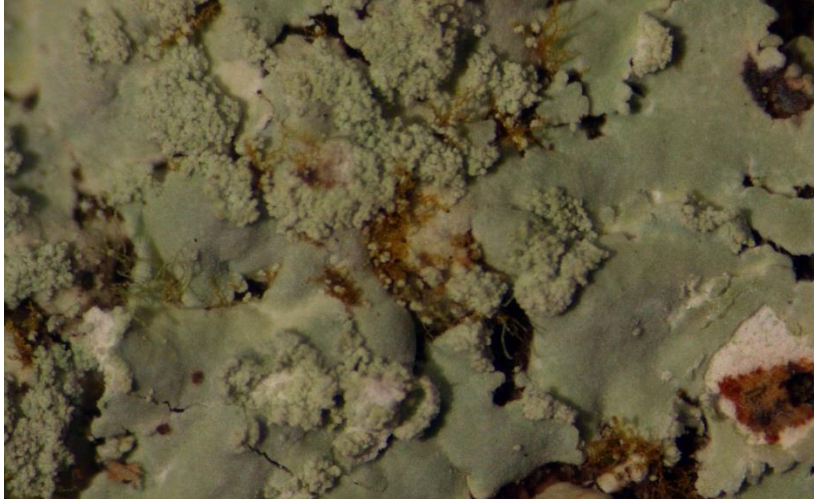
Cool Fact: This is one of the most common *Parmotrema* species in Florida. There are approximately 25 species known from the state.



Physcia solediosa

Habitat: In NATL, this species is found on branches of hardwood trees in the mesic forests.

Key Characteristics: This is a small solediate species that has a mostly dark lower side, but the margin is white. This could resemble *Heterodermia albicans*, but the lower side color is the defining characteristic.



Pyxine eschweileri

Habitat: In NATL, this species is found on branches of hardwood trees in the hydric forests and most likely the mesic forests.

Key Characteristics: This species looks like a *Dirinaria* or *Physcia* but has a mostly white lower side and soredia that are pustulate. Also this is the only species in the key that has a slightly orangish colored middle layer (medulla).



Ramalina montagnei

Habitat: In NATL, this species is found on branches of hardwood trees in the mesic and hydric forests.

Key Characteristics: Fruticose lichen that has smooth flattened branches and white striations on the branches. This species looks very similar to *R. stenospora* which may also be present at NATL. The difference is that the later species does not have white striations.



Usnea strigosa

Habitat: In NATL, this species is found on fallen branches in mesic and hydric habitats, is abundant along the SEEP Trail.

Key Characteristics: This is a fruticose lichen with numerous perpendicular branchlets. The apothecia are green flattened spheres that have hairs attached to their edges. This genus could superficially be confused with *Ramalina* however *Usnea* has a central cord (see picture below).

Cool Fact: This is the most common fruticose lichen at NATL.

