GUIDE TO THE MOSSES OF CENTRAL FLORIDA WITH AN INTERACTIVE KEY

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This guide has been prepared as an adjunct to the Atlas of Florida Plants. It includes an interactive key and illustrated species profile pages. The guide presently focuses on the common mosses of central Florida and includes 59 species, or for some entries just a genus.

The guide is a work in progress, with the intention to gradually expand it to include less common species, as well as to expand the area of coverage from Central Florida to the entire state. It will therefore be periodically updated.

The guide also includes an index, which includes all species reported as occurring in Florida, with the species included in the key set in bold face and larger type. The index also serves as a list of photo credits for the species included in the species profile pages.

The key is in pdf format, with active links to move through the key and to the species profile pages. In the profile pages and the index, there are links to the appropriate pages in the Atlas.

To make the guide as broadly useful as possible, simple botanical and/or English terminology has been used, rather than the specialized bryophyte terminology of technical keys.

Corrections and suggestions will be greatly appreciated, and should be sent to Fred Essig at essig@usf.edu.
Interactive Key

1. Plants with distinct upright or leaning, often trunk-like, stems with multiple leafy side shoots or clusters of compact, bud-like shoots at the tip (*Sphagnum, Climacium*)

2. Leafy shoots +/-unbranched or branching at the base or from older non-green parts of the system, perpendicular to the growing surface or leaning and parallel with one another at least when fresh, spore capsules arising from the tips of the leafy shoots or from specialized short shoots (acrocarpus)

3. Leafy shoots spreading and branching parallel with the growing surface or extending outward from tree trunks and branches; spore capsules arising along the sides of the leafy shoots (pleurocarpous)
[Leafy shoots with upright, trunk-like stem and many leafy side shoots]
(from p. 1)

1. Main shoots with clusters of compact, bud-like shoots at the top, and drooping side shoots below; leaves with narrow bands of photosynthetic cells surrounding large, banded water-storage cells, sporangia spherical (*Sphagnum*)

2. Main shoot with leafy side branches stiff, horizontal or angling upward; photosynthetic tissue simple, not surrounding water-storage cells; spore capsules brown, narrow-cylindrical

.....*Climacium americanum*
Notes: The leaves of *Sphagnum* species have a unique anatomy, dominated by large water-storage cells, reinforced by multiple thin bands of cellulose. The photosynthetic cells appear as narrow, green bands between the water storage cells.

The following two species are common in central Florida. A number of others occur in the state, mostly further north, but some are reported as far south as Highlands County. Further study of the species found in central Florida is needed.

1. Upright shoots elongate, loose, bright green, occurring in thick stands or bogs on flat, wet meadows or seeps
   .... *Sphagnum recurvum*

2. Shoots compact, crowded, grayish, occurring on dry sandy soil in shady woods .... *Sphagnum strictum*
1. Shoots distinctly flattened, resembling a pinnately compound leaf
   (also from p. 16)
   a. Leaves double, with second small leaf attached to the base of each main leaf, pointed at end; spore capsules arising from the tips of the shoots .... *Fissidens spp.*

   b. Leaves simple, ribbon-like, rounded at tip; spore capsules nestled among leaves, without elongate stalks
      i. Leaves flat .... *Neckeropsis disticha*
      ii. Leaves crisped or rumpled .... *Neckeropsis undulata*

2. Shoots not distinctly flattened; leaves spirally arranged or crowded at the tip into a rosette
1. Leafy shoots elongate, stems 3 – 10 cm long or more with many evenly spaced green leaves

   a. Found on soil in exposed places

   b. Found on tree bases, roots, adjacent soil, logs or wet rocks

   c. Found on limestone rocks that are often dry; leaves strongly curled or twisted when dry; spore capsule with long, spirally wound teeth around opening

   ...*Barbula indica*

2. Leafy shoots with green portions compact, less than 3 cm high; leaves evenly spaced or crowded near the tip of a short stem
1. Upper leaf surface rough or spongy, with up to 20 blades or ribbons of tissue running lengthwise, obscuring the view of the leaf cells and midrib beneath; leaf cells not papillose .... *Polytrichum commune*

2. Leaf surface smooth, transparent; leaf cells papillose

   a. Leafy shoots frequently with small, scale-like, vegetative reproductive units at tips of whiplike extensions; colonies loose, open; on wet, organic soil .... *Aulacomnium palustre*

   b. Leafy shoots without small scale-like reproductive units; on wet to dry soil

      i. Leaves up to 4.5 mm long; colonies forming dense, deep cushions with green leaves only at the tips and many dead leaves below; rarely producing spore capsules .... *Dicranum condensatum*

      ii. Leaves up to 2.5 mm long; colonies loose, shoots mostly green.... *Archidium* spp.
1. Leafy shoots to 6 or more cm long; midrib thick, conspicuous

   a. Leaves 6-8 mm long, with large, multicellular teeth on margins and midrib, rolled inward and loosely twisted around stem when dry; on tree bases and logs ... *Pyrrhobryum spiniforme*

   b. Leaves 1.4-1.6 mm long, lacking teeth, flat and twisted closely around stem when dry; on logs, tree trunks and branches ... *Schlotheimia rugosa*

2. Leafy shoots mostly less than 6 cm long; leaf margins with small, simple teeth or smooth; midrib present but weak

   a. Leaf margins with tiny, simple teeth; midrib faint, but extending into a narrow point at the tip; leaf cells elongate-rectangular, upper ends of cells extended into papillae; spore capsules spherical; on constantly wet rocks or banks ... *Philonotis longiseta*

   b. Leaf margins smooth; midrib weak, not extending to tip, leaf tip rounded; leaf cells tiny, roundish, papillose throughout; spore capsules long-ovate; found on limestone and tree bark ... *Anomodon minor*
[Green portion of leafy shoots compact, less than 3 cm high]
(from p. 5)

1. Found mostly on soil, mudflats

2. Found mostly on tree trunks, bases, roots, or logs

3. Found on limestone rocks that are dry much of the time; spore capsule with long, spirally wound teeth around opening
[Leafy shoots less than 3 cm high, found on soil or mudflats]
(from p. 8)

1. Leaves less than 4 mm long  
   p. 10

2. Leaves 4-8 mm long

   a. Leaves thin, transparent; cells and midrib fully visible under light microscope
      i. Leaves grayish or brownish-green, stiff, 4-7 mm long; leaf tufts sometimes elevated on scaly stalks
         .... *Campylopus surinamensis*
      ii. Leaves light green, flexible, grass-like, up to 7 mm long on very short stem .... *Ditrichum pallidum*

   b. Leaves rough or spongy on the upper surface due to multiple ribbons or blades of tissue running the length of the leaf, which obscure most of the view of the underlying cells and midrib .... *Atrichum angustatum*
1. Leafy shoots virtually stemless, leaves crowded into a rosette of uniform height, evenly spaced in flat colonies

2. Leafy shoots elongate, with leaves arranged evenly along the stem or more crowded near the tip of the stem

   a. Leaves ovate and broadly pointed, with midrib reaching the tip, or projecting beyond it as a sharp, needle-like awn; leaf cells large, rectangular to elongate-polygonal, with many distinct chloroplasts; stalks of spore capsules reddish or brownish, nodding by a bend in the stalk (Family Bryaceae)

   b. Leaves tapering gradually to a narrow tip which is filled with the very thick midrib; leaf cells narrow, elongate; stalks of spore capsules yellowish, capsules upright or slightly bent to the side .....*Dicranella spp.*
1. Colonies forming permanent, compact mounds on dry substrates
   a. Colonies forming grayish-green mounds 2-10 mm high; leaves scale-like, pressed to the stem; on dry, sandy soil
      .... *Bryum argenteum*
   b. Colonies forming dense, dark-green mounds 10-20 mm high; leaves spreading; leaf with midrib extending into a sharp, needle-like awn; on rocks, concrete, or asphalt...
      *Brachymenium macrocarpum*

2. Colonies of loose, ephemeral green shoots on wet soil
   a. Leaves evenly spaced along the stem; in moist shady soil
      *Gemmabryum apiculatum*
   b. Leaves becoming crowded, rosette-like, toward the tip; often around pond edges .... *Rosulabryum pseudocapillare*
[Leafy shoots virtually stemless, of uniform height, evenly spaced in flat colonies]  
(from p. 10)

1. Leaves broad, ovate, at least in lower part, not distinctly grooved on the upper surface; leaf cells hexagonal to rectangular, not papillose

   a. Leaves 2-3 mm long; leaf cells large, hexagonal to rectangular, with thin cell walls; midrib reaching tip of leaf; Spore capsules bent to the side; on sterile, disturbed, or burned-over soil .... *Funaria flavicans*

   b. Leaves ovate, concave, up to 2 mm long, toothed at tip; leaf cells rectangular; midrib often not quite reaching the tip of the leaf; spore capsules upright; on wet, disturbed soil .... *Physcomitrium pyriforme*

   c. Leaves 3-4 mm long, with broad basal region and prolonged narrow tip; midrib thick, conspicuous; leaf cells small, irregular; spore capsules narrow, upright, with a thickened base .... *Trematodon longicollis*

2. Leaves narrow, up to 2.5 mm long, margins slightly rolled or folded together creating a distinct channel or groove on the upper surface; leaf cells papillose:

   a. Plants typically forming dense, permanent colonies; leaves not toothed; leaf cells squarish; spore capsules on long stalks .... *Weissia controversa*

   b. Plants tiny, widely-spaced, appearing seasonally along drying pond margins; leaves toothed, leaf cells irregular-rectangular, papillose near tip; spore capsules on very short stalks .... *Ephemerum crassinervium*
1. Leaves less than 2 mm long, boat-shaped, thick, succulent, less than 1 mm long; mostly on exposed roots and adjacent soil in dry woods

.... *Leucobryum albidum*

2. Leaves 3 to 5 mm long; on tree bases and trunks, especially on palms
   a. Leaves green, with massive midrib, rolled inward and curled when dry; blade one cell thick and with masses of large, empty cells at base
      i. Bearing spore capsules in season, rarely with vegetative reproductive bodies on upper leaves.... *Syrrhopodon incompletus*
      ii. Not known to produce spore capsules in North America, but round clusters of hair-like reproductive units often present on the tips of the upper leaves
       .... *Calympres palisoti*
   b. Leaves whitish green, without midrib; blade thick, opaque, several cell layers thick, lacking empty cells at the base, margins smooth
       .... *Octoblepharum albidum*
1. Leafy shoots 3 cm or more long; leaves strongly curled when dry, area of clear cells at the base without a V-shaped boundary; leaf cells usually papillose. **Barbula indica**

2. Leafy shoots less than 1 cm
   a. Leaves strongly curled when dry, area of clear cells at the base with a distinct V-boundary; leaf cells papillose

   ....**Tortella spp.**

   b. Leaves not strongly curled or twisted when dry, lacking a V-shaped pattern of clear cells at the base; leaf cells rarely papillose

   ...**Hyophiladelphus agrarius**
1. Leafy shoots simple or occasionally branched, strongly flattened, resembling a pinnately compound leaf

2. Leafy shoots much-branched, and roughly triangular, atop a thick, stalk-like main shoot, flattened, resembling a fern frond  .... *Thuidium delicatulum*

3. Leafy shoots branching irregularly, leaves spirally arranged around the stem or moderately flattened
   a. Leaves with a single or no midrib, or with two very short ribs at the base  .... *Callicostella pallida*
1. Leaves flat or slightly wavy, not strongly curled when dry
   a. Leaves pressed toward the stem, at least when dry
   b. Leaves spreading away from stem when dry

2. Leaves strongly curled or twisted when dry
4. [Leaves pressed toward the stem, at least when dry (from p. 16)]

1. Leaf cells not papillose

2. Leaf cells papillose
[Leaf cells not papillose]
(from p. 17)

1. Plants on open, dry to moist soil, sometimes solitary and more-or-less upright, but more often branching and lying on the soil; leaves with strong midrib extending into a long point, leaf cells roundish-angular or narrow rectangular [capsules without stalks] ....

*Archidium* spp. (5 species in Florida)

2. Plants growing on wood or bark
   a. Growing on tree bases, stumps, exposed roots, and sometimes on rocks
      i. Leaf cells long, worm-like; midrib lacking; spore capsules cylindrical, upright.... *Entodon seductrix*
      ii. Leaf cells small, roundish; midrib present, wavy, not quite reaching the tip of the leaf .... *Herpetineuron tocoae*

   b. Growing high on tree trunks or branches .... p. 20
1. Midrib absent; leaf cells narrow-ovate to angular; spore capsules erect, ovoid to short-cylindrical

   ..... *Schwetschkeopsis fabronia*

2. Midrib present
   a. Leaves ovate with a broad tip, without teeth; spore capsule erect, narrow-cylindrical and broad at the tip   ..... *Leskea australis*

   b. Leaves broader than long, with a narrow, whip-like tip and numerous teeth; spore capsule erect, tapered at tip

   ..... *Thelia asprella*

   c. Leaves broad at the base, tapering to a long pointed tip, with few small teeth; foliage sometimes with orangish cast; spore capsules curved to the side

   ... *Haplocladium microphyllum*
[Growing high on tree trunks, dry branches]
(from p. 16) or (from p. 18)

1. Leaf cells not papillose

   a. Leaf cells square to roundish; spore capsules on very short stalks.... *Cryphaea glomerata*

   b. Leaf cells worm-shaped
      i. Spore capsules on very short stalks; shoots not twisted to the side when dry.... *Forsstroemia trichomitria*
      ii. Spore capsules on elongate stalks; shoots twisted to the side when dry

   c. Leaf cells squarish to diamond-shaped; spore capsules on long stalks .... *Clasmatodon parvulus*

2. Leaf cells papillose

   a. Midrib lacking; cells toward the leaf tips papillose
      ......*Leucodon julaceus*

   b. Midrib present but not reaching the tip; leaf cells spindle-shaped, each with several papillae in a line
      .... *Papillaria nigrescens*
1. Plants mostly aquatic, sometimes above water in moist habitats
   a. Leaves to 4 mm long, wide-spreading, lacking a midrib ... *Fontinalis sullivantii*
   b. Leaves to 6 mm long, wide-spreading, with a distinct midrib ... *Leptodictyum riparium*
   c. Leaves to 2 mm long, angled upward, ovate with a long narrow point, spirally arranged around the stem, with a distinct midrib ... *Hygroamblystegium varium*

2. Plants on trees, logs, roots, and adjacent soil
1. Midrib present, leaves conspicuously toothed

   p. 23

2. Midrib absent or short and double; leaves not toothed or with a few small teeth near the tip

   p. 24
1 - Leaves ovate, abruptly narrowing to a pointed tip, concave and arching toward tip; spore capsules ovoid, slightly bent to the side. .... *Oxyrrhynchium hians*

2 – Leaves long-ovate, gradually tapering to a pointed tip, flat and spreading to the sides; spore capsule strongly curved, constricted below mouth .... *Rhynchostegium serrulatum*
1. Leaf cells diamond-shaped to elongate-angular; spore capsules short-ovoid, twisted to the side or inverted by a hook in the stalk

.... *Vesicularia vesicularis*

2. Leaf cells slender to worm-like; spore capsules themselves bent or curved downward
   a. Leaves with prolonged, narrow tip; with moderate-sized square to rectangular empty cells at the base of the leaf; spore capsules strongly curved downward, somewhat narrowed below the mouth .... *Isopterygium tenerum*

b. Leaves ovate, with short pointed tips, with leaf cells papillose and with conspicuous large, roundish-rectangular, empty cells at the base of the leaf; spore capsules bent to the side but ovoid in shape

.... *Taxithelium planum*
Leaves strongly curled or twisted when dry]  
(from p. 16)

1. Entire leafy shoot conspicuously curved to the side (as if wind-blown) when dry (*Sematophyllum, Pylasia*)

2. Leafy shoot more or less straight, leaves individually twisted or curled
   a. Leaves elongate, 1-2.5 mm long, flat, curled when dry; midrib not reaching the tip; leaf cells small, roundish-angular, usually with a single papillum; spore capsules asymmetric, arising along sides of the stem; on tree bases, exposed roots, logs, rocks
      .... *Stereophyllum radiculosum*
   b. Leaves elongate, to 1.6 mm long, tightly twisted around stem when dry, not papillose; midrib reaching tip of leaf; spore capsules straight, arising from the tips of the stems; growing on tree trunks and branches
      .... *Schlotheimia rugifolia*
   c. Leaves broadly ovate, with strong midrib almost reaching tip, strongly toothed, well separated from one another, strongly curled when dry; leaf cells tiny, roundish; tree bases, rotting logs, rocks, rich soil
      .... *Plagiomnium cuspidatum*
1. Cells at base of leaf elongate; spore capsules constricted below the mouth  
   \textit{...Sematophyllum adnatum}\textbf{\textcolor{red}{\textit{}}}

2. Cells at base of leaf squarish; spore capsule not constricted below the mouth  
   \textit{...Pylaisia selwynii}
**Sphagnum recurvum** P. Beauvois

Sphagnaceae

Distinguished by the lush, deep green, elongate, loose stems, with dense clusters of buds at the tip and long drooping side shoots. Occurring in extensive stands in flat, wet meadows and seeps.
*Sphagnum strictum* Sullivant
Sphagnaceae

Distinctive for the compact, grayish leafy shoots. Occurring on dry, sandy soil in woodlands.
Climacium americanum Bridel
(Climaciaceae)

Distinguished by the tree-like habit, ovate to triangular leaves with a distinct midrib nearly to the tip and jagged teeth in the upper part. Occurring on damp soil along rivers, decaying logs in cypress swamps.
Neckeropsis disticha (Hedw.) Kindb.
Neckeraceae

Leafy shoots are initially simple, but branching with age, sticking out or hanging from the surface of rocks, logs, and tree trunks in moist situations.
Neckeropsis undulata (Hedw.) Reichardt
Neckeraceae

Distinguished from *N. disticha* by the rumpled leaves, but similar in growth form and habitat.
The genus **Fissidens**

The genus includes 19 species in Florida, 17 of which occur throughout the state in overlapping distributions. The species are difficult to distinguish, and some herbarium records may not be accurate. The genus, however, is unmistakable by its peculiar double leaf structure.

*Fissidens taxifolia*. By Ralf Wagner
**Polytrichum commune** Hedw.
Polytrichaceae

Distinguished by its large size, with leafy shoots up to 10 cm in height, and with leaves stiff and evenly spaced along the stem. Shares with *Atrichum* the rough, spongy texture due to the many parallel ribs of tissue running the length of the upper surface.
Aulacomnium palustre (Hedw.) Schwägr.
Aulacomniaceae

Distinguished by the clusters of scale-like, vegetative reproductive units at tips of whiplike extensions of the shoots; Leaves folded toward the stem when dry; leaf cells papillose
Dicranum condensatum Hedwig
Dicranaceae

Distinguished by the colonies forming dense, deep cushions, with only the upper leaves green, on dry, sandy soil.
**Pyrrhobryum spiniforme** (Hedw.) Mitt.
Rhizogoniaceae

Distinguished by the prominent, multicellular teeth on the leaf margins and prominent midrib; on tree bases, rotting logs, rocks.
Philonotis longiseta (Michx.) E. Britton
Bartramiaceae

Leaf margins with tiny, simple teeth; midrib faint, but extending into a narrow point at the tip; leaf cells elongate-rectangular, upper ends of cells extended into papillae; spore capsules spherical; on constantly wet rocks or banks

....
Anomodon minor (Hedwig) Lindberg
Anomodontaceae

Distinctive for its rounded leaf tips and tiny, roundish, papillose leaf cells; shoots typically horizontal or hanging from limestone or tree bark.
**Atrichum angustatum** (Brid.) Bruch & Schimp.
Polytrichaceae

Distinctive for its long, wavy leaves with rough or spongy upper surface due to the closely-spaced parallel ribs of upright tissue.

all photos by Robert A. Klips
Campylopus surinamensis Müll. Hal.
Dicranaceae

Distinctive for its grayish or brownish-green coloration and its long, stiff leaves in a dense tuft that is sometimes elevated on a scaly stalk; growing on dry, sandy soil
**Ditrichum pallidum** (Hedw.) Hampe
Ditrichaceae

Distinctive for its long, light green, grass-like leaves arising from a very condensed stem
Brachymenium macrocarpum Cardot
Bryaceae
**Bryum argenteum** Hedw.

a. Colonies of compact, evergreen, grayish shoots 2-10 mm high; leaves scale-like, pressed to the stem; on dry, sandy soil

....
Rosulabryum pseudocapillare (Besch.) Ochyra

Colonies of ephemeral green shoots up to 15 mm high, with leaves spreading; on wet soil
**Gemmabryum apiculatum** (Schwaeg.) J. R. Spence & H. P. Ramsay (Bryaceae)

Distinguished from other local members of the Bryaceae, by the evenly spaced leaves and brown, pear-shaped bulbils along the rhizoids or leaf axils. Occuring in damp soil in shady locations.
*Dicranella* spp.  
*Dicranaceae*

Leafy shoots somewhat elongate, forming loose mounds, sometimes partially buried in sand; Leaves 2-3 mm long, leaf cells elongate elliptical to angular, with thick walls; spore capsules asymmetric, bent to the side; on moist banks and disturbed sites, including phosphate pits

The genus reaches its southern limit in central Florida. There are three variable species reported in this area, differing primarily on characteristics of their spore capsules. Most specimens in our area are identified as either *D. heteromalla* or *D. hilariana*. This needs further critical study.
**Weissia controversa** Hedw.

Pottiaceae

Distinguished from similar species by the flat, dense, evergreen colonies and the distinctly grooved leaves. This is the most common species in our area, though two other species have been reported.
Ephemerum crassinervium (Schwaegr.) Hampe
Ephemeraceae

Distinguished from Weissia and similar species by the tiny, sparsely-spaced shoots found seasonally along drying pond margins
Funaria flavicans  Michx.  
Funariaceae

Distinguished from similar species by its nodding spore capsules, which are abundant in the spring; on sterile, disturbed, or burned-over soil.
Physcomitrium pyriforme (Hedw.) Hampe
Funariaceae

Distinguished from related species by the upright, pear-shaped spore capsules; found commonly in the springtime on wet, disturbed soil.
Trematodon longicollis Michx.  
Bruchiaceae  
Distinguished from similar species by the narrow leaf with a massive midrib and prolonged narrow tip and its narrow, upright spore capsule with thickened base; on moist soil, sometimes appearing in garden beds.
Syrrhopodon incompletus Schwaegr.
Calympерaceae

Distinguished by the finely-toothed leaves with massive midrib and masses of large, empty cells at base; common throughout the state on tree bases and palm trunks.
A related species, also reported throughout the state, is S. texanus, which is distinguished by a distinct border of elongate, empty cells in the upper part of the leaf, and a tendency to form vegetative reproductive units at the leaf tips.
Octoblepharum albidum Hedw.
Leucophanaceae

Distinguished by the thick, whitish green leaves without midrib; common throughout the state on tree bases and palm trunks.
Leucobryum albidum (P. Beauv.) Lindb.
Leucobryaceae

Distinguished by the thick, succulent, boat-shaped leaves with no midrib; abundant, common, on exposed roots and adjacent soil in dry woods.
Calymperes palisoti Schwaegr.
Calymperaceae

Distinguished by the round clusters of hair-like reproductive units often present at the leaf tips, and leaves rolled inward and curled when dry with extensive patches of large, clear cells at the base; tree trunks and logs in southern Florida, may be in our area.
Distinguished by the distinct V-shaped boundary between the regular cells and the large area of clear cells at the base of the leaf; found in a variety of inland habitats. Shares the long, twisted teeth around the mouth of the spore capsule with *Barbula* and *Hyophiladelphus*.

A second species in our area, *T. flavovirens* is a coastal, salt-tolerant species, with more rounded leaf tips, and rarely produces spore capsules.
*Barbula indica* (Hook.) Spreng.
Pottiaceae

Distinguished from related species by the leafy shoots up to 3 cm long, and leaves lacking the V-shaped boundary between regular cells and the clear cells at the base.
**Hyophiladelphus agrarius** (Hedw.) R.H. Zander
Pottiaceae

Distinguished from similar species on limestone by the leaves not strongly curled or twisted when dry, the non-papillose leaf cells, and lacking a distinct area of clear cells at the base of the leaf.
Callicostella pallida (Hornsch.) Ångstr.
Pilotrichaceae

Distinguished by the leaves with two distinct midribs reaching almost to the tip, and the moist habitat
The genus is distinguished by the elongate stems, sometimes unbranched and more-or-less upright, but sometimes branching and lying on the soil; spore capsules roundish, without stalks, and nestled among the leaves, terminal or appearing to be on the sides due to the branching pattern. Uncommon, on open, dry to moist soil. Five species reported from Florida, distinguishable by technical characters. More work is needed.
Thuidium delicatulum (Hedw.) Schimp

Thuidiaceae

Distinguished by the distinctly frond-like leafy shoot systems; Occurring on soil, tree bases, logs, stumps and rocks in shady woodlands.
**Haplocladium microphyllum** (Hedw.) Broth.
Leskeaceae

Distinguished by the ovate leaves with prolonged tip; abundant and common on limestone, concrete, and heavily irrigated soil, occasionally on tree bases. The unrelated and less common species, *Cyrto-hypnum minutulum*, is similar in appearance and habitat, but with leaves without the prolonged tip and with the midrib not reaching the tip.
Entodon seductrix (Hedw.) Müll. Hal.  
Entodontaceae

Distinguished from similar species by the elongate, wavy leaf cells, lack of a midrib, and the upright, cylindrical spore capsules.
**Herpetineuron toccoae**  (Sull. & Lesq. Ex Sull. In Gray) Card.  
Anonodontaceae

Distinguished by the wavy midrib, not quite reaching the tip of the leaf
**Schwetschkeopsis fabronia** (Schwägr.) Broth.  
Myrinaceae

Distinguished by the small, scale-like leaves lacking a midrib; occurring on bases of hardwood trees and rocks.
Leskea australis Sharp
Leskeaceae

Distinguished by the ovate leaves without teeth; occurring on tree bases, logs
**Thelia asprella** (Schimp.) Sull. & Lesq.
Theliaceae

Distinguished by the very broad, short, much-toothed, scale-like leaves with a narrow, whip-like extension at the tip; occurring on tree bases, logs and adjacent soil, sometimes on rocks.
Leucodon julaceus (Hedw.) Sull.
Leucodontaceae

Distinguished by leaves lacking a midrib; cells toward the leaf tips papillose
**Papillaria nigrescens** (Hedw.) A. Jaeger

Meteoraceae

Distinguished by the spindle-shaped leaves, containing several papillae in a line
Cryphaea glomerata  Schimp. ex Sull.  
Cryphaeaceae

Distinguished among epiphytic species by the leaf cells square to roundish and spore capsules hidden among leaves.
*Forsstroemia trichomitria* (Hedw.) Lindb. (Cryphaeaceae)

Distinguished among epiphytic species by the short-worm-shaped leaves and the bright orange spore capsules on short stalks.
Clasmatodon parvulus (Hampe) Sullivant
Brachytheciaceae

Distinguished from similar species by the leaf cells squarish to diamond-shaped; spore capsules on long stalks
**Fontinalis sullivantii** Lindberg  
Fontinalaceae

Distinguished from other aquatic species by the leaves lacking a midrib.
Leptodictyum riparium (Hedwig) Warnstorf
Amblystegiaceae

Distinguished from other aquatic species by the long leaves (to 6 mm) long and with a distinct midrib
Hygroamblystegium varium (Hedwig) Mönkemeyer
Amblystegiaceae

Distinguished among the aquatic species by the short leaf (to 2 mm) with a distinct midrib
Oxyrrhynchium hians (Hedwig) Loeske
Brachytheciaceae

Distinguished by the ovate, conspicuously toothed leaves with a midrib, and ovoid spore capsules slightly bent to the side.
Rhynchostegium serrulatum (Hedwig) A. Jaeger
Brachytheciaceae
Distinguished by the conspicuously toothed, long-ovate leaves with midrib, gradually tapering to a pointed tip, and the spore capsule strongly curved, constricted below mouth.
*Isopterygium tenerum* (Swartz) Mitten
Hypnaceae

Distinguished from other species growing on tree bases by the leaves that remain angled away from the stem when dry, with slender, worm-like cells and no midrib.
**Vesicularia vesicularis** (Schwagrichen) Brotherus

Hypnaceae

Distinguished from *Isopterygium* by the diamond-shaped leaf cells and the spore capsules turned down by a bend in the stalk.
**Taxithelium planum** (Brid.) Mitt.
Sematophyllaceae

Similar to *Isopterygium* but with leaf cells papillose and with conspicuous large, roundish-rectangular empty cells at the base of the leaf.
Stereophyllum radiculatum (Hook.) Mitt.
Stereophyllaceae

Distinguished by the long, flat leaves that curl; on tree bases, exposed roots, logs, rocks
**Schlotheimia rugifolia** (Hook.) Schwaegr.
Orthotrichaceae

Distinguished by the leaves that twist around the stem when dry; leafy shoots sometimes branching in the green portion; spore capsules arising from the tips of the stems; growing on logs, tree trunks and branches.
**Plagiomnium cuspidatum** (Hedw.) T.J. Kop.  
Mniaceae

Distinguished by the broadly ovate, heavily toothed, leaves with strong midrib and tiny, roundish leaf cells; on tree bases, rotting logs, rocks, rich soil.
Sematophyllum adnatum (Michx.) E. Britton
Sematophyllaceae

Distinguished by the shoots that curve strongly to the side when dry, the upright spore capsules that are constricted below the mouth. Common on tree trunks and branches, especially live oaks.
Pylaisia selwynii Kindb.
Hypnaceae

Similar to Sematophyllum, but cells at base of leaf squarish rather than elongate and spore capsules not constricted below the mouth.
Index and Photo credits

Species presently included in the guide are in bold face and larger type, and followed by photo credits. Clicking on these names will take you to the appropriate page in the guide. Species reported from the state of Florida in Flora Noth America or in herbarium collections, but not yet included in the key, are in smaller print. These species may be rare, of dubious inclusion, uncertain key characters, or found only in the far north or far south of the state. Clicking on these names will take you to the appropriate page in the Atlas of Florida Plants. Current focus is on Central Florida, but this guide will be continually updated and will eventually include all species verified in the state. Please contact Dr. Frederick B. Essig at essig@usf.edu with any additional information, photos that may be included, or other corrections or suggestions.

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Acaulon muticum
Anacamptodon splachnoides
Acroporium smallii
Anomodon attenuatus

Anomodon minor – top: Robert A Klips; bottom: Frederick B. Essig

Anomodon rostratus
Anomodon tristis
Aphanorrhegma serratum
Arrhenopterum heterostichum

Archidium spp
Archidium alternifolium
Archidium hallii
Archidium minus
Archidium ohioense
Archidium tenerrimum
Ardeum auranticum

Atrichum angustatum – Robert A Klips

Atrichum crispum
Atrichum cylindricum
Aulacomnium palustre - top: Robert A Klips; bottom: WNM
Barbula convoluta

Barbula indica – Frederick B. Essig
Barbula unguiculata

Brachymenium macrocarpum – Upper left: Ainun Nadhifah; rest: Frederick B. Essig
Brachelyma subulata
Brachythecium acuminatum
Brachythecium laetum
Brachythecium rotaeanum
Bruchia carolinae
Bruchia drummondii
Bruchia flexuosana
Bruchia ravenelii
Bryhnia graminicolor
Bryoandersonia illecebra

Bryum argenteum – Frederick B. Essig

Callicostella pallida – Frederick B. Essig
Calymperes afzelii
Calymperes erosum

Calymperes palisot – S. Churchill, © MBG
Calymperes pallidum
Calymperes tenerum
Campyliadelphus chrosphyllus

Campylopus angustiretis
Campylopus arctocarpus
Campylopus carolinae
Campylopus pyriformis

Campylopus surinamensis - Frederick B. Essig

Clasmatodon parvulus - CNABC

Climacium americanum – Robert A Klips
Cryphaea filiformis

Cryphaea glomerata – top: Alan Franck, rest: Frederick B. Essig
Cryphaea nervosa
Dichelyma capillaceum

Dicranella heteromalla – Robert A. Klips

Dicranella hilariana – Frederick B. Essig
Dicranella lindigiana
Dicranella varia
Dicranodontium denudatum

Dicranum condensatum – Frederick B. Essig
Dicranum flagellare
Dicranum scoparium
Didymodon rigidulus

Ditrichum pallidum – Frederick B. Essig
Ditrichum pusillum
Donnellia commutata
Drepanoclados polygamus
Eccremidium floridanum
Entodon challengeri
Entodon cladorrhizans
Entodon macropodus

Entodon seductrix – Frederick B. Essig
Entodontopsis leucostega
Entosthodon drummondii
Ephemerum cohaerens

Ephemerum crassinervium – Robert A. Klips
Ephemerum spinulosum
Eucladium verticillatum

**Fissidens** spp.– Ralf Wagner

*Fissidens adianthoides*
*Fissidens amoenus*
*Fissidens bryoides*
*Fissidens bushii*
*Fissidens dubius*
*Fissidens elegans*
*Fissidens fontanus*
*Fissidens hallianus*
*Fissidens leptophyllus*
*Fissidens minutulus*
*Fissidens obtusifolius*
*Fissidens pallidinervis*
*Fissidens pellucidus*
*Fissidens polypodioides*
*Fissidens santa-clarensis*
*Fissidens serratus*
*Fissidens subbasilaris*
*Fissidens taxifolius*
*Fissidens zollingeri*
*Fontinalis novae-angliae*
*Fontinalis sphagnifolia*

**Fontinalis sullivantii** – leafy shoot: Kurt Stuber, CC

**Forsstroemia trichomitria** – top: Alan Franck, rest: Frederick B. Essig

**Funaria flaviensis** – Frederick B. Essig

*Funaria hygrometrica*
*Funaria serrata*
**Gemmabryum apiculatum** – u.l.: Frederick B. Essig; rest: Ainun Nadhifah

Gemmabryum coronatum
Gemmabryum exile
Grimmia laevigata

Groutiella tomentosa
Groutiella tumidula
Gymnostomiella orcuttii

**Haplocladium microphyllum** – Frederick B. Essig

Haplocladium virginianum
Hedwigia ciliata
Henicodium geniculatum

**Herpetineuron toccoae** – habit: Blanca Shaw, CNABC; leaf and cells: Frederick B. Essig

Homalotheeciella subcapillata

**Hygroamblystegium varium** – Frederick B. Essig

Hymenostylium recurvirostrum
Hyophila involuta

**Hyophiladelphus agrarius** – Frederick B. Essig

Hyphnum imponens
Hyphnum lindbergii (reported from Florida in FNA, not in Atlas)

**Isopterygium tenerum** – Frederick B. Essig

Jaegerina scariosa
Leptobryum pyriforme

**Leptodictyum riparium** – Frederick B. Essig

**Leskea australis** – Frederick B. Essig

Leskea gracilescens
Leskea obscura

**Leucobryum albidum** – Frederick B. Essig

Leucobryum glaucum
Leucodon julaceus – upper: Scott Schuette, © MBG, CC; lower: Gerrit Davidse, ©MBG, CC

Luisierella barbula
Macromitrium richardii
Micromitrium megalosporum
Micromitrium synoicum
Micromitrium tenerum
Mnium hornum (reported from Florida in FNA, not in Atlas)
Mnium thomsonii

Neckeropsis disticha – Elizabeth Lavocat Bernard
Neckeropsis undulata – Elizabeth Lavocat Bernard
Octoblepharum albidum – Frederick B. Essig
Orthotrichum ohioense (reported from Florida in FNA, not in Atlas)
Orthotrichum pusillum (reported from Florida in FNA, not in Atlas)
Oxyrrynchium hians – Robert A. Klips

Papillaria nigrescens – Frederick B. Essig

Philonotis fontana
Philonotis gracillima
Philonotis longiseta – Frederick B. Essig

Philonotis marchica
Philonotis sphaerocarpa
Philonotis uncinata

Physcomitrium pyriforme – Frederick B. Essig

Pirella cymbifolia
Pirella pohlii

Plagiomnium ciliare

Plagiomnium cuspidatum – top: Frederick B. Essig; whole leaf: WNM; whole plant and close-up of spore capsules, Robert A. Klips
Plagiomnium floridanum
Platygyrium repens
Platylomella lescurii
Plaubelia sprengelii
Pleuridium ravenelii
Pleuridium subulatum
Pleuridium sullivantii (reported from Florida in FNA, not in Atlas)
Pogonatum brachyphyllum
Pogonatum pensilvanicum
Pohlia nutans (reported from Florida in FNA, not in Atlas)

*Polytrichum commune* - top left: Kristian Peters, CC; top right: Steve Dickman; lower left: Frederick B. Essig

Pseudocampylium radicale
Pseudocryphaea domingensis
Ptychomitrium drummondii
Ptychomitrium incurvum

*Pylaisia selwynii* – habit: Wayne Lampa, CNABC; leaf WNM

*Pyrrhobryum spiniforme* – top: Alan Cressler; rest: Frederick B. Essig

Racopilum tomentosum

*Rhynchostegium serrulatum* – Robert A. Klips

Rosulabryum capillare (photos switched with pseudocapillare in Atlas)

*Rosulabryum pseudocapillare* – Frederick B. Essig

*Schlotheimia rugifolia* – Juan David Parra, © MBG, CC

Schoenobryum concavifolium

*Schwetschkeopsis fabronia* - Frederick B. Essig

Sciuro-hypnum plumosum

*Sematophyllum adnatum* – Frederick B. Essig

Sematophyllum demissum
Sematophyllum subinnatum
Splachnobryum obtusum
Solmsiella biseriata
Sphagnum affine
Sphagnum bartelttianum
Sphagnum carolinianum
Sphagnum compactum
Sphagnum cribrosum
Sphagnum cuspidatum
Sphagnum cyclophyllum
Sphagnum fitzgeraldii
Sphagnum henryense
Sphagnum lescurii
Sphagnum macrophyllum
Sphagnum magellanicum
Sphagnum microcarpum
Sphagnum molle
Sphagnum palustre
Sphagnum perichaetiale
Sphagnum portoricense

**Sphagnum recurvum** – Frederick B. Essig

**Sphagnum strictum** – Frederick B. Essig

Sphagnum tenerum
Sphagnum trinitense
Splachnobryum obtusum
Splachnum pensylvanicum

**Stereophyllum radiculorum** – all by Juan David Parra, ©MBG, CC
Syrrhopodon gaudichaudii

**Syrrhopodon incompletus** – Frederick B. Essig
Syrrhopodon ligulatus
Syrrhopodon parasticus
Syrrhopodon prolifer
Syrrhopodon texanus
Taxiphyllum alternans
Taxiphyllum cuspidifolium
Taxiphyllum taxirameum

**Taxithelium planum** – Scott Zona

*Tetrathis pellucida* (reported from Florida in FNA, not in Atlas)

**Thelia asprella** – *all by* Robert A. Klips
Thelia hirtella
Thelia leucurii
Thuidium alleniorum

**Thuidium delicatum** – Frederick B. Essig

Tortella flavovirens

**Tortella humilis** – Leaves: Hermann Schachner, CC; Sporangium, WNU; whole plant, Frederick B. Essig

*Tortula acaulon* (reported from Florida in FNA, not in Atlas)

Tortula muralis
Tortula plinthobia

**Trematodon longicollis** – Frederick B. Essig

*Trichostomum crispulum* (reported from Florida in FNA, not in Atlas)

Tuerckheimia svihae

**Vesicularia vesicularia** - Scott Zona

**Weissia controversa** – Frederick B. Essig

Weissia jamaicensis
Weissia ludoviciana
Weissia muehlenbergiana