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Psilotum looks like a fossil

Ancient oceans shaped the landscape of Seabranched Preserve State Park near Hobe Sound, Florida, and the result for visitors is an accessible variety of natural communities – everything from xeric sand pine scrub to low, wet, swampy, shadowy, ferny, prehistoric forest. My unscientific rule of thumb is: the swamplier the woods, the more primitive they are. The swampy lands in Seabranched look like a museum dinosaur diorama with ferns taller than a person, tree trunks festooned with dangle mossy things, and a lush carpet of primordial ooze only a salamander might love. Here is a venue to see plants we think of as primitive, if you define “primitive” as representing a particularly ancient plant group.

The Seabranched swamp is a wonderland of liverworts, which are about as primitive as a land plant can be. Mosses are likewise ancient, ferns are too, and bald cypress is no evolutionary spring chicken. We are glancing back to plant

Featured Flora by George Rogers: *Psilotum nudum* (Whisk Fern)

Top: This fossil *Cooksonia pertoni* from Scotland's Rhynie Chert looks remarkably similar to the familiar fern ally *Psilotum nudum*. Photo by Dr. Hans Steur. **Bottom:** *Psilotum nudum* is often found growing in Florida's swampy areas. Photo by George Rogers.

groups that are, in rough terms, four times older than flowering plants and 400 times older than humans.

Today's swampy encounters take the imagination back 400 million years to the early Devonian Period. Looking down from space a modern alien wouldn't recognize the Devonian Earth. Europe and Asia were a single continent. So were Africa, India, Australia and Antarctica. And, creeping forth from the ancient seas, plants had only recently invaded the land.

Despite the passage of almost half a billion years, you might be surprised how much we know about the early land plants thanks to exquisite fossils preserving anatomical details over the eons. The most famous Devonian plant fossil site is called the Rhynie Chert near Aberdeen, Scotland, where an entire swamp is so perfectly mineralized it looks like a stone-wizard waved his magic wand just yesterday.

The structure of these ancient plants shows distinctive, evenly forked, Y-shaped branching, in contrast with the uneven branching patterns characteristic of modern plant stems. Ancient plants had no roots, although underground rhizomes were fashionable. And, as remains true of modern ferns and the so-called fern allies, ancient land plants reproduced by spores rather than by flowers, fruits, and seeds. The spore cases were either on the tips or the sides of the stems. (A spore differs from a seed in many ways, principally by being merely a single cell).

Whisk-fern (*Psilotum nudum*), native to a good part of Florida, would have been comfortably at home in the Rhynie Chert. *Psilotum* has no flowers, fruits, or seeds. The branching is evenly Y-shaped in the prehistoric fashion, and the spores occupy little pillboxes along the side of the stem. It looks nothing like a modern plant; instead, it looks like the ancient fossils.

Life is never straightforward. DNA and other studies undermine the idea of

Psilotum nudum (Whisk Fern)

Habitat: Terrestrial in wet woods, swamps, mesic hammocks, on and around tree bases, commonly those of the sabal palm (*Sabal palmetto*); also epiphytic on logs and in the forks of trees.

Distribution: From the central Panhandle counties of Gulf, Leon, and Wakulla, eastward, southward and throughout the peninsula.

Psilotum nudum was discovered in Florida in the late 1800s. The specific epithet, *nudum*, was originally conferred by Linnaeus, means “bare” and refers to the plant's leafless stems.

From: *The Ferns of Florida* by Gil Nelson

Psilotum as a diehard from Devonian times. DNA places it among the ferns, so in contemporary classifications it is one. So why a plant that looks like it's straight out of Rhynie doesn't show exactly the expected relationships is a wee conundrum for future botanists. In the meantime, in my mind it jumped right out of the rocks.

If you're wondering about spores, by the way, as in ferns and other fern allies, and certainly also in the prehistoric land plants, they don't germinate like a seed and replicate the parent plant. *Psilotum* spores germinate into a tiny, completely underground generation living off of subterranean fungal symbiosis. The baby *Psilotum*, technically called the gametophyte, looks like a root without the rest of the plant. You'll never see one. But it's not so hard to find the parent *Psilotum* hanging out of the broken leaf bases on cabbage palms, or occasionally on moist hummocks in the swamp. And there is even an easier way to visit Jurassic Park – these plants are often found as weeds springing forth from plant nursery flowerpots.

Further Reading

For a more technical overview of *Psilotum*, including its similarity to the Rhynie Flora, see: Bidlack, J., and S. Janskey. *Stern's Introductory Plant Biology*, 13th Ed. McGraw Hill, NY. 2014. [P. 392-394.]

About the Author

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