Pinellas Epiphytes

Pinellas County Natural Resources

Introduction

Many of Florida's native trees are festooned with loads of hitchhiking plants. With one exception, mistletoe, these plants are not parasites, nor do they do any harm to the trees whatsoever. They are just seeking a spot in the sun; to grow and reproduce. These aerial arboreta are made up of a specialized group of plants known collectively as epiphytes.

What is an epiphyte? The word comes from epi- which means "upon" and –phyto which refers to plants. So, literally, upon plants! From algae to ferns to flowering plants, this adaptation to life on the branches of trees provides a space in the sun without having to grow very tall.

In Pinellas County, the majority of native plants growing as epiphytes are in the bromeliad Family, Bromeliaceae, and in one Genus, *Tillandsia*. We also have three native epiphytic ferns, and a couple of species of orchids. These are plants that have evolved an epiphytic growth habit. It may not be unusual to see a seedling of a non-epiphytic plant growing in the organic matter that has collected in the crotch of a tree, those would be considered incidental epiphytes.

Fig. 1 Tree trunk with *Tillandsia* spp.

An epiphytic growth habit comes with challenges. In return for getting a place in the sun, epiphytes' roots have adapted to anchor the plant to the tree; losing the ability to draw water up from the soil and into the plants' tissues. Bromeliads can store water in their leaf bases, absorbing water like a sponge via a covering of tiny scales, and many have very tough leaves that can avoid drying out. One of our native ferns, the Resurrection fern *Pleopeltis michauxiana (*Fig. 3) can almost completely dry out before re-absorbing rainfall and "resurrecting." Epiphytic orchids have a modified root system that is covered in a velvety "velum" that is absorptive. Orchids can also photosynthesize via chlorophyll in their roots. This is important for one species we will meet later.

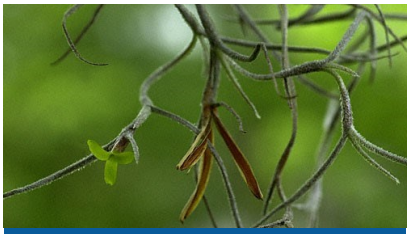


Fig. 2 Spanish Moss: flower and fruit

Fig. 3 Resurrection fern (*Pleopeltis michauxiana*)

Bromeliads, the "Air Plants"

Bromeliads have an interesting global distribution. The center of evolution is Central and South America, with the greatest diversity found there. There is, however a disjunct distribution of a single species found in west-central Africa; possibly colonized via the Caribbean Islands or from a time when Africa was physically closer to South America.

Fig. 4 Ball Moss: open fruit releasing seeds

Fig. 5 Southern Needleleaf showing red pigmentation

Surface Area

Several of our native Bromeliad species have reduced leaves covered in tiny scales. These scales increase the surface area of the leaf and thus the carrying capacity of rainwater and even humidity. In the absence of absorptive roots, these plants rely on being sponge-like to gather and retain life-giving water.

Fig. 6 Close-up of Spanish Moss showing scales on the surface of leaves.

Bromeliads are important economically, not just the world-famous pineapple, but as ornamental plants as well. In Pinellas we can grow a host of species and cultivars in our landscapes; most of which have parentage from species that are from South America. This fact will prove germane as we examine several species under threat in Florida.

Of the many different Genera and species within the Bromeliad family, only one genus occurs naturally in Pinellas: *Tillandsia* spp. We have eight different species, each with striking features that allow us to tell them apart. Of the eight species, only four are considered abundant. The others are under attack by an introduced weevil that threatens to have severe impacts to wild populations. More on that later.

Arguably the best known of our native Tillandsia species is the one called Spanish moss, *T. usneoides*. Note: this plant is neither from Spain, nor is it a moss. It is a true flowering plant, whose parts have been dramatically reduced to leaves and occasional flowers (Fig. 2). Spanish moss is often cited as a villainous thug, bent on the destruction of its host tree. If a tree is in decline, for whatever reason or stress factor, Spanish moss may out-pace its host in terms of speed of growth. The result appears as a dramatic smothering of the tree by moss. In fact, Spanish moss needs plenty of sunlight in order to thrive, and its seeds are carried by the wind to land and sprout in the branches of another tree. If the host tree should die and fall to the ground, neither of these needs would be met.

Another common "air plant" is Ball moss, *T. recurvata*. This species can often be found growing on power and telephone lines, chain-link fences and even on the sides of buildings. Still think it is a parasite? Think again… Ball moss gets its name from the recurved leaves that form a ball. Flowers are produced on long stalks that, when mature, release the air-borne seeds to establish more ball-moss far and wide (Fig. 3). Both Spanish moss and Ball moss are covered in tiny, membranous scales that increase the surface area of the plant and are capable of absorbing rainwater, fog and even evaporated water! (Fig. 6)

Central Florida hardwood swamps are home to the Southern needleleaf bromeliad, *T. setacea*. "Setae" means bristles, and this species' leaves are narrow and long and, well, bristly! In winter these plants take on a rich reddish hue, perhaps as a response to increased sunlight levels as deciduous species of trees lose leaves (Fig. 5).

The Florida airplant, *T. simulata* is only found in Florida. All the other species we will examine here are found elsewhere in the Southeast US, the Caribbean, Mexico, Central and South America. The name "simulata" refers to it resembling or "simulating" another species. Stiff, silvery leaves and an upright growth habit distinguish this species from the others we have examined thus far. At flowering time, usually preceding the rainy season, this plant produces a bright red flowering stalk up to 30cm long. This stalk then produces a sequence of rich, purple tubular flowers.

The following species have been negatively impacted by an introduced, invasive species of insect. The insect is the Mexican bromeliad weevil, *Metamasius callazona,* and it most likely found its way to Florida on plants imported from Mexico for their ornamental value. Whatever the method of introduction, it is here and its larvae consume the "heart" of those species that tend to hold water in their leaf bases (Fig. 8). Once the heart is consumed, the leaves fall apart and the individual bromeliad is finished. Infestation is not obvious until the damage is done. A biological control (a species of fly) is being evaluated as a potential natural predator of this weevil.

The Northern needleleaf *T. balbisiana* is distinctive for having the most-recurved (curliest) leaves of the central Florida species. In addition, this species' leaf bases form a very distinctive, swollen urn. The flower spikes of this species are very bright red. Pinellas is just about the northern range of the Northern needleleaf, although it has been recorded in Orange County (C.MacGregor, 2000). Because of habitat destruction and the "evil weevil" this plant is listed as Threatened in the state.

The Giant Airplant, (*T. utriculata*) and the Cardinal Airplant (*T. fascuculata*) both share the distinction of being our largest native Bromeliad species in Pinellas. The giant airplant has an interesting life history. After years of growing, it produces a huge (1.5 m) bloom spike, hundreds of flowers and up to 10,000 seeds. After the seeds have been released into the air, the plant dies. The cardinal airplant will flower year after year, with brightly colored yellow and red flower spikes. Its showy nature has led to its over-collection from the wild for sale.

Ferns

There are three epiphytic ferns found in Pinellas County. All three are usually found in wetland habitats growing on tree branches over the water.

The Resurrection Fern (*Pleopeltis michauxiana*) may be seen in various stages of desiccation depending on whether or not it has rained recently. Individual fronds are about 7.5 cm (3") long from the base of the petiole to the tip of the blade. Fronds are produced along a creeping rhizome with roots anchoring the whole plant to the tree (or whatever it is growing on…) Like its fern kin, spores are produced in tiny sporangia clustered into groups of spots on the underside (abaxial surface) of the frond. These spots of sporangia are called sori (singular: sorus). The blade of the frond is pinnatifid, that is, so deeply lobed as to appear as though the blade were divided into individual leaflets (pinnae).

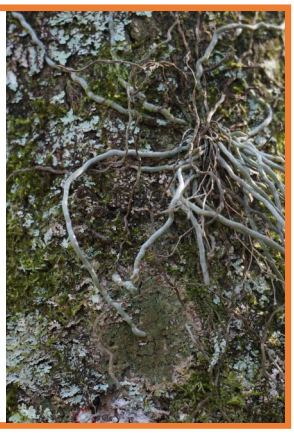
Resurrection fern can occur as a huge colony reaching from near the base of a tall tree, all the way into the branches. This

Fig. 7 Epiphytic Butterfly Orchid, *Encyclia tampensis*

Fig. 8 Leaf bases of Giant Airplant showing weevil damage (UF)

Needleroot Orchid

Not much more than a tangle of roots and an occasional spray of tiny flowers, this native orchid, *Dendrophylax porrectus*, is hard to spot in the habitat it prefers. Found on smooth-barked trees in wetlands, this orchid is considered Threatened in the State.



plant has adapted to life in the treetops by becoming very, very drought tolerant. Instead of having roots in nice damp soil, this fern's roots are otherwise occupied, holding on to its substrate. In between rain showers and for most of the dry season, resurrection fern blades are curled around the top side (**ad**axial surface) of the frond. Plant leaves have tiny pores usually on the abaxial surface called stomata (from Greek: mouth). This is where carbon dioxide and water are "inhaled." These specialized organs can be opened or shut depending on time of day, temperature, or other environmental conditions. When the resurrection fern is in the process of drying out, the stomata are opened and desiccation happens rapidly. When rains return, the stomata are again opened and the frond quickly re-hydrates. The abaxial surface of the frond is also covered in brownish scales. These help collect and hold rainwater like a sponge.

Another epiphytic fern is the Shoestring Fern (*Vittaria lineata*). By its common name and the specific epithet "lineata" you can guess what the fronds look like: long, green strands. In more southerly swamps the fronds can reach 60cm (2') in length, here they are more like 10cm (4"). The fronds have incurved margins where the sori are found.

Finally our third truly epiphytic fern is the Golden Foot Polypody, *Phlebodium aureum*. Phlebodium shares the same root as phlebotomist, a specialist in drawing blood, and it means "veiny." This fern has a substantial frond with a strong petiole supporting a 50cm (1.5') deeply pinnatifid blade. "Aureum" means gold. The gold in this fern is found in its "feet." The growing tips of the rhizome are covered in long hair-like scales giving them a fuzzy, rabbit's foot appearance. In *P. aureum* the scales are a beautiful golden orange that shine when the sun hits them just right. This species is not abundant in the county, but you will see it in more southerly swamps crowded into the leaf-bases (boots) of Cabbage Palm, *Sabal palmetto*. Unfortunately the invasive Boston Fern or Tuberous Sword Fern, *Nephrolepis cordifolia*, also thrives in this habitat.

Orchids

Of the 19 species of Orchids found in Pinellas, only two are epiphytic: the Butterfly Orchid, *Encyclia tampensis*, and the Needleroot Airplant Orchid, *Dendrophylax porrectus*.

The Butterfly Orchid (Fig. 7) regularly flowers here in Pinellas each June. This species is found most often on tree branches that overhang seasonally wet areas. These areas include cypress domes and flooded forests. Orchids do not have root hairs like most other land plants have; instead their roots are covered in a velvety tissue called vellum. This acts more like a sponge, mopping up and storing rainwater as well as moisture from humidity and evaporate.

The name *Encyclia* refers to the landing-pad petal (lip or labellum) which is curled around the pollen-bearing structure (column), encircling it. The column bears the tiny pollen suitcases (pollinia) that stick to the face of tiny native bees that visit the flowers in search of nectar. The specific epithet *tampensis* refers to the first plant collected and described which happened somewhere in the Tampa Bay area in 1847.

The Needleroot Airplant orchid is leafless. Like many other epiphytic orchids worldwide, the roots contain photosynthetic tissues that can help facilitate sugar production. This orchid depends on its roots alone to provide for its needs. The narrow whitish roots with bright green growing tips form small (10cm, 4") spiderlike encrustations on smooth-barked trees. The flowers are vanishingly small, likely moth pollinated. The fruit is the size of a large acorn held on wiry stem. Like all orchids, the fruit is a dry dehiscent capsule that splits upon maturity to release the dust-like seeds. Until recently this species was in a different Genus: *Harrisella*. DNA work has revealed that it is so closely related to the famous "Ghost Orchid" *Dendrophylax lendinii* that it belongs in that Genus.

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