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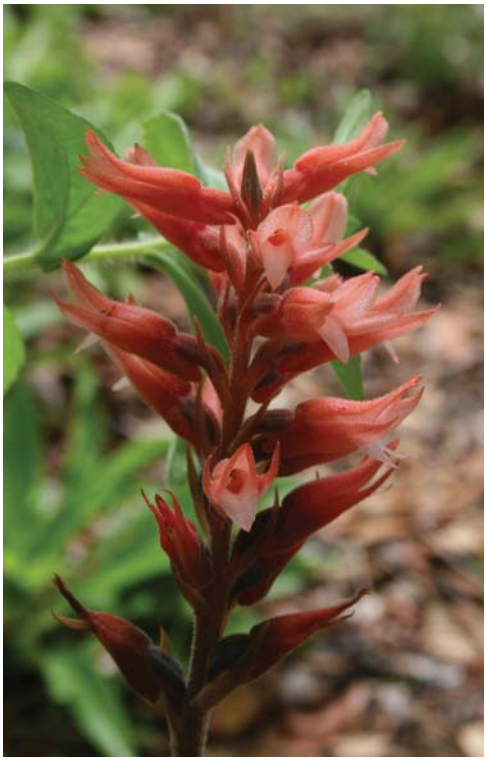
Palmetto

A New Species of Native Orchid? • A Conversation With Doug Tallamy • Florida's Botanical Art

Typical flowers of *Sacoila paludicola*.
All photos by Craig Huegel.

A "New" Species of Native Florida Orchid? *Sacoila paludicola*



Typical flowers of *Sacoila lanceolata* var. *lanceolata*. Note the difference in color and flower structure from that of *Sacoila paludicola*.

Late-season flower stalk of *Sacoila paludicola*. It is obvious that most flowers develop into seed capsules.

Typical *Sacoila paludicola*. Note yellowing basal leaves and the tall thin flower stalk typical for this species.

By: Craig N. Huegel, Ph.D.

Florida is blessed with approximately 100 orchids in its native flora (Wunderlin 1998, Brown and Folsom 2006). Some of these are relict terrestrial species from an earlier climate; now found only in the northernmost counties of Florida and more common north of us. A few, such as the recently described *Pteroglossaspis potsii*, are endemic; found only in isolated pockets of the state. Others are epiphytic or terrestrial species confined in Florida largely to the Fakahatchee Strand State Preserve and lands adjacent, but also distributed in the Caribbean, and/or in Central and South America. A relatively large, but confined, population of one of these, the leafy beaked ladiestresses (*Sacoila lanceolata* var. *paludicola*) was recently discovered in southern Sarasota County; more than 90 linear miles from it's nearest previously known location. Data collected since this discovery provides strong evidence that the leafy beaked ladiestresses is a unique species, properly referred to as *Sacoila paludicola*.

Since it was first described by Carl Luer (1971) from observations he made in 1965 within the Fakahatchee Strand State Preserve, the leafy beaked ladiestresses has been considered merely a distinct variety of the more common and widespread leafless beaked ladiestresses (*Sacoila lanceolata*); distinguished largely by whether leaves are present at blooming or not. As their common names denote, the leafless beaked ladiestresses loses its leaves many weeks before the emergence of its flower stalk. The leafy beaked ladiestresses, however, tends to keep its leaves until blooming is initiated. While this single trait has simplified field identification, Luer noted many other significant differences between the localized population of "leafy *Sacoila lanceolata*" orchids (or *Spiranthes lanceolata* as they were then called) and the more common leafless variety. Although he considered the differences to be "minor" and attributable to "natural variation", he described numerous characteristics that differentiated the two forms, including habitat preference; leaf shape, persistence and "glossiness"; flower color and size; and blooming season. He also noted that these differences were not the result of growing-condition influences; that plants of each variety maintained their unique differences even when grown in pots next to each other and given the same culture.

The taxonomic classification of the "leafy" variety of this orchid has persisted perhaps because no new populations have been found outside the general area of Fakahatchee Strand State Preserve and it has not been well studied. Populations found in the general vicinity of the type location described by Luer and later from nearby Corkscrew Swamp in Collier County are naturally occurring. Small populations of this orchid also have been identified within the Big Cypress National Preserve (Jimi Sadle, personal communication), but not within the nearby Florida Panther National Wildlife Refuge, (Stewart and Richardson, 2008) and it is questionable whether other populations (i.e. Miami-Dade, Broward and Palm Beach Counties) were purposely introduced (Hammer, 2001; P.M. Brown, personal communication). It is certain that Frank Craighead made several attempts to introduce it from the Fakahatchee Strand to areas within Everglades National Park during the mid-1900s, that at least one population continues to persist inside the park boundary, and that several other populations persisted for years (and possibly disseminated seed) before finally disappearing (Hammer, 2001).

Non-random distribution of *Sacoila paludicola* within the study site. Flags mark the locations of individual orchids.

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A "New" Species of Native Florida Orchid?

Dehiscing seed capsules. Because *Sacoila paludicola* is self-pollinating, nearly every flower develops into a seed capsule.

Hammer (2001) also cites anecdotal information questioning the natural occurrence of the colony recently found in Broward County. As such, the "leafy" variety of this orchid has one of the most-restricted natural ranges of any of Florida's orchid species. Without more specimens for study, taxonomists largely accepted Luer's original assessment that this orchid is a localized variety, shaped by its occurrence in the denser shade and wetter soils of the Fakahatchee Strand.

The range of this orchid changed dramatically in 2007, however, when a disjunct population of nearly 300 individual leafy beaked ladiestresses was discovered in a small area of hydric hammock in south Sarasota County by the author, Kathleen McConnell, and Nina Raymond. This discovery allowed for a closer investigation of the characteristics previously noted by Luer to see if differences between the two varieties were consistent. The results of this fieldwork have been published elsewhere (Huegel and McConnell 2008). In addition, morphological and ecological data collected from this population have resulted in a proposed change to its taxonomic status; elevating it to species status, *Sacoila paludicola* (Brown 2008). For the remainder of this article, I will use this new, but as yet unaccepted, scientific name for the leafy beaked ladiestresses.

The newly discovered Sarasota population of *Sacoila paludicola* is restricted to a region of hydric hammock that rarely floods and occurs in an area less than 2 acres in size. Although extensive searches were conducted elsewhere in the region, its restricted occurrence to this area is well defined by ecological conditions not present elsewhere on the property. Based on published written descriptions (e.g. Hammer, 2001; Hammer, 2002) and personal conversations (Mike Owen, Jimi Sadle), these conditions are very similar to those found for previously known populations from south Florida.

The forest community is characterized by a nearly closed canopy dominated by laurel oak (*Quercus laurifolia*) and cabbage palm (*Sabal palmetto*), although strangler fig (*Ficus aurea*), live oak (*Quercus virginiana*), sweet bay (*Magnolia virginiana*), swamp bay (*Persea palustris*), dahoon holly (*Ilex cassine*), and red mulberry (*Morus rubra*) are scattered throughout. Various woody shrubs comprise the mid-canopy, especially saw palmetto (*Serenoa repens*), wild coffee (*Psychotria nervosa* and *P. sulzneri*), and American beautyberry (*Callicarpa americana*). The understory is dominated by ferns, especially swamp fern (*Blechnum serrulatum*), marsh fern (*Thelypteris palustris*), and whisk fern (*Psilotum nudum*). In addition to *S. paludicola*, two other terrestrial orchids are common; the toothpetal and longhorn false reinorchids (*Habenaria odontopetala* and *H. quinqueseta*, respectively). Also present in the understory of the hammock is wild coco (*Eulophia alta*), although this orchid is not generally found growing within the same areas of the forest as *S. paludicola*. The soils are hydric, contain high organic concentrations, and are either saturated near the surface, or inundated for 6 to 9 months each year. Also possibly important is the absence of feral hogs (*Sus scrofa*). They have not been present for at least the past decade according to the current land manager at the site. Some evidence of groundcover disturbance, caused by the nine-banded armadillo (*Dasypus novemcinctus*), was noticeable, but the characteristic large-scale rooting and vegetative destruction caused by hogs has not altered this forest understory.

Sacoila paludicola was not distributed uniformly within the hammock forest. Its distribution was noticeably restricted to the more open patches where saw palmetto, in particular, was less dominant. For the most part, *S. paludicola* was more abundant along the edges of unimproved walking trails and within patches where the understory was less dominated by woody species. In these areas, the control of Brazilian pepper (*Schinus terebinthifolius*) has also served to maintain a greater degree of openness within the mid canopy than in other regions of the property. The land manager has made a concerted effort to remove the debris by hand from this nuisance plant control program rather than piling and leaving the material on site. Although the site burned extensively during the summer of 1989, the effects of this fire seem to have been rather uniform throughout the hammock and do not seem to explain the distributional pattern of *S. paludicola*. Any subtle changes that might have been present immediately after the fire would likely have been lost during the intervening 19 years.

Soil conditions also seem to be a major influence on the distribution of *Sacoila paludicola* within the project site. Although high organic soils are uniformly present throughout the hydric hammock where this species occurs, the hydrology is more variable. The region occupied by this species does not seem to be inundated for extended periods, but seems to remain nearly saturated during most months. Areas of extended or reduced hydrology do not seem capable of supporting this species.

This narrow habitat restriction differs greatly from the habitats occupied by *Sacoila lanceolata*. *S. lanceolata* has been described from nearly every county in peninsular Florida, and from the Caribbean, Central and South America as far south as Uruguay. Throughout this region, it is found in open sunny locations, such as pastures, roadsides, and open woodlands; not in shady hydric forests.

Sacoila paludicola does not always maintain its leaves to the flowering season. Less than 10 percent of the Sarasota County population was leafless at the initiation of blooming in 2008, but this sample did not include any orchids that may have already lost their leaves by March and did not produce a flower stalk. Fieldwork conducted in July 2008 confirmed our suspicions that a larger percentage of the population loses its leaves prior to the blooming period than was previously measured. At this time, more than 50 unmarked mature plants were located within the same location as the marked ones; evidence that they may had been overlooked because they were leafless at the start of the March 2008 field season.

Although most *Sacoila paludicola* in our population had leaves at

the time flower stalks were forming, most had leaves that were clearly turning yellow or were dead, but still attached. Less than 25 percent had leaves that were green and seemingly vigorous. Although leaf loss in *S. paludicola* seems to be more prevalent than previously believed, it still is in sharp contrast to *S. lanceolata* which always loses its leaves prior to the development of an above-ground flower stalk and typically is leafless for four weeks or more prior to the flowering season.

The extended presence of leaves in *S. paludicola* seems important to the production of a flower stalk. Although most plants do not bloom in any given year, we saw a positive relationship between the number of leaves produced and flowering. Every plant that had four and five leaves produced a flower stalk as did 50 percent that produced three leaves. Plants having one or two leaves produced flower stalks in significantly lower percentages

Like *Sacoila lanceolata*, *S. paludicola* eventually loses its leaves. Leaves were generally absent or dead by 8 May when flowering was completed and seed capsules were dehiscing. Plants do not lose all of their leaves at the same time, however. Nearly half of the plants that retained leaves on 8 May lost at least one of them between 3 April and 8 May. Plants also do not remain leafless for long once their leaves are lost. Most seem to initiate new leaves within just a few weeks. Although *S. paludicola* is deciduous, the length of time that it remains leafless is decidedly less than that of *S. lanceolata*.

The maintenance of leaves is likely an adaptation to life within shady forested habitats. While *S. lanceolata* is found most commonly growing in open, sunny areas where abundant energy required for blooming can be acquired and stored in a shorter period of time, *S. paludicola* is resident to habitats where far less solar energy reaches its leaves. Under these conditions, maintaining leaves for a longer period may be necessary to store sufficient energy to allow for the development of a flowering stalk. Our data suggests that the total surface area of leaves for blooming plants was greater than that for non-blooming ones.

Flowering is also decidedly different between the two species. As described by Luer (1971), *Sacoila paludicola* blooms earlier than *S. lanceolata*, and the flowers are noticeably different in both color and structure. Flowering was synchronous and occurred during a 4-week period between mid-March and mid-April. All flowers were a uniform scarlet red in color. Flower stalks were well-developed during a 24 February site visit, but the flower buds were immature and no flowers were evident. Flowering was evident on a return field visit 15 March, but was at its peak on 30 March. By 3 April, flowering was nearly completed. No flowering was evident on a 20 April site visit.

The flowering period of the Sarasota population of *Sacoila paludicola* is nearly identical to that found in the Fakahatchee Strand, based on nearly a decade of unpublished observations recorded by Preserve biologists and shared with the author (Mike Owen, personal communication). It also seems to closely correspond to the blooming season of herbarium specimens of *S. paludicola* collected while in flower in western Cuba (Jim Ackerman, Univ. Puerto Rico, personal communication). This differs markedly from blooming season dates reported in the literature for *S. lanceolata* in Florida (Hammer, 2002; Brown and Folsom, 2005; Stewart and Richardson, 2008), suggesting that *S. lanceolata* does not initiate blooming until late-April and that the peak of blooming occurs sometime in May.

The two species also have very different pollination strategies. Catling (1987) found that *Sacoila paludicola* is self-pollinating; not apomictic (fertile seed production without pollination) like south Florida populations of *S. lanceolata* or pollinated by hummingbirds like populations of *S. lanceolata* outside of Florida. Catling postulated that apomicty developed in south Florida *S. lanceolata* populations because of a lack of hummingbirds during the May-June blooming season. This is not likely the selection pressure faced by *S. paludicola*, however, as ruby-throated hummingbirds (*Archilochus colubris*) are not uncommon migrants in south Florida during its earlier blooming season. The universal development of a pollinator-independent reproductive strategy in *S. paludicola* is more likely a response to the selection pressure required by its different habitat requirements. Ruby-throated hummingbirds are less likely to occur in the shady forested habitats where *S. paludicola* occurs than in the sunnier pastures and roadsides favored by *S. lanceolata*.

The differences between *Sacoila paludicola* and *S. lanceolata* are great and seem to be the result of long-term adaptation to the vastly different habitat conditions exploited by each species. Our observations suggest that the population discovered in Sarasota County exhibits similar physical characteristics and ecological requirements to previously known populations in extreme south Florida; characteristics and requirements that are quite dissimilar to populations of *S. lanceolata*. Although further study is warranted, this stability within disparate populations of each individual species throughout its known range and the stark differences between the two species irrespective of geographic range suggests that these are not varieties of the same species, but separate ones. Although this is the same assertion made by P.M. Brown (2008), the final decision is yet to be made and may be debated for some time.

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Palmetto

The purpose of the Florida Native Plant Society is to conserve, preserve, and restore the native plants and native plant communities of Florida.

Official definition of native plant:
For most purposes, the phrase Florida native plant refers to those species occurring within the state boundaries prior to European contact, according to the best available scientific and historical documentation. More specifically, it includes those species understood as indigenous, occurring in natural associations in habitats that existed prior to significant human impacts and alterations of the landscape.

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