

the TROPICAL GARDEN

WINTER 2016

Fairchild's Orchid Program:

The synergy of science education, outreach and the
beauty of the world's most coveted plant



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Cover

Phalaenopsis sp.

Come see this and many other
beautiful orchids in our newest
orchid exhibit: Orchid Odyssey
in the Simons Rainforest.

Photo by Kenneth Setzer/FTBG



The Strange Life of the **STRANGLER FIG**

From canopy dweller to massive tree,
with a reproductive cycle reliant on
both male and female wasps

Text and photos by Kenneth Setzer

Somewhere, right now, a bird—maybe the ubiquitous mockingbird or bluejay, or a white-crowned pigeon—is pecking at a small fruit in lieu of its favored small vertebrates, deciding if it’s one of the many it considers edible. It swallows the fruit nearly whole, all in a split second. It’s a common occurrence, but also the beginning of a dramatic lifecycle happening all around us.

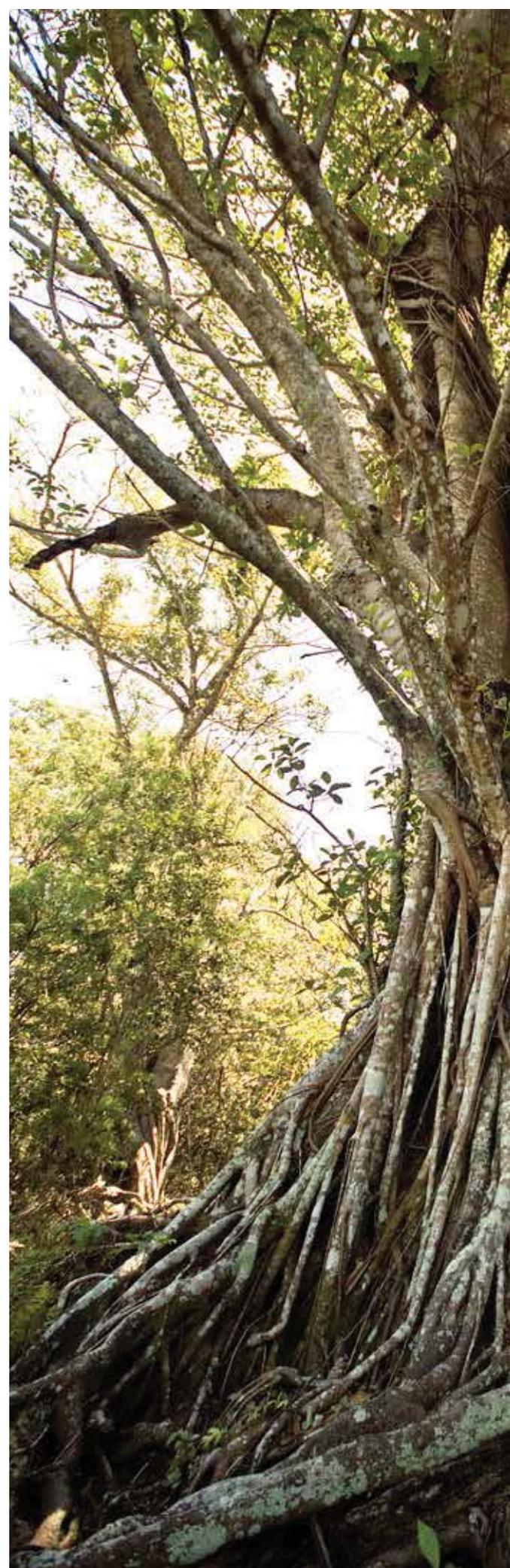
The fruit—really a false fruit called a syconium—is that of the Florida strangler fig, *Ficus aurea*. *Ficus* pollination involves a complex, perfectly timed and coordinated mutualism between the tree and a wasp (more on the wasp later). Our fig-eating bird must eventually deposit the remains of its meal, quite possibly on a tree limb. Now surrounded by a packet of sticky fertilizer, a *Ficus* seed that managed to survive avian digestion might germinate high up in the tree canopy. As the rain and sun signal the seed to grow, it sends out aerial roots to adhere to its supporting limb and embryonic leaves to begin photosynthesis; its life as an epiphyte has begun.

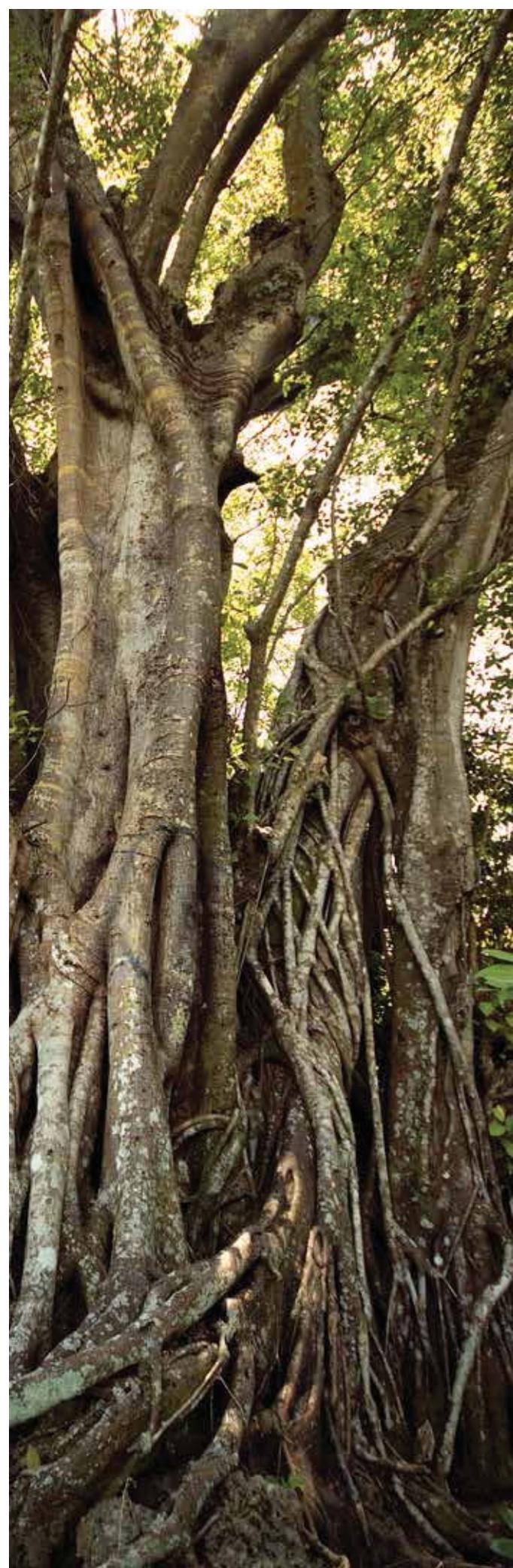
Strangler fig actually refers to many species of *Ficus*, which all may start out life this way—though many can germinate terrestrially and grow as freestanding trees. Those beginning as epiphytes use a tree for support, but do not directly draw nutrients like a parasite. As the aerial roots reach for the ground, the leaves take advantage of access to sunlight available from the *Ficus*’s advantageous perch on high—an adaptation for gaining a foothold in a crowded, light-deprived forest, while simultaneously avoiding floods and ground-dwelling herbivores. When those same roots reach soil, they begin to penetrate it. The strangler is now a hemiepiphyte (having spent part of its lifecycle as an epiphyte). With resources from the soil now available, the strangler fig really begins to grow.

Living up to its name, the strangler fig embraces its host in what becomes a latticework prison of wood; the original host tree now begins to suffer. The strangler is competing with it for precious sunlight, and with access to the ground, it’s competing for groundwater and soil nutrients, too. The strangler fig’s aerial roots fuse together and fill in to form areas of solid wood covering over the host, severely restricting its outward, secondary growth.

As in most aspects of the strangler’s life, reproduction, too, is unusual. Its syconium is a hollow ball containing hundreds of clustered flowers on the inside. It is the part we recognize as a fig. Each *Ficus* species has a specific fig wasp mutualist it requires for pollination, with the wasp in turn needing the fig for its own reproductive cycle. A female wasp loaded with *Ficus* pollen enters the syconium through a tiny opening, the ostiole.

PREVIOUS PAGE
Ficus subcordata
at Fairchild. Plot 28.





The *Ficus* syconium contains both male and female flowers, but at this stage, only the female flowers are mature and receptive. Inside, the wasp lays her eggs on female flowers, simultaneously spreading the pollen. The flowers containing eggs develop a gall, thus enclosing a young wasp within.

Meanwhile, the now-pollinated flowers are fertile and may produce seeds. Male wasps mature from eggs first, and are the first to emerge from their galls. They search for females within the syconium to mate with, which they do before the females even emerge from their respective gall.

By the time the female wasps have mated and are ready to emerge from their galls, the male fig flowers have matured. Now covered in pollen from the male flowers, the female wasps can emerge into the outside world to find a new syconium and begin the process again, in an amazing orchestration of perfectly timed events.

This synchrony is indeed amazing, but equally so is the asynchronous fruiting within a community of *Ficus* trees. If all trees of a given species produced syconia simultaneously, the fig wasp would have nowhere to lay her eggs after exiting her natal syconium. By staggering the production of syconia, the *Ficus* trees ensure this will not happen. This also means figs are available nearly year round for the creatures that depend on them, like non-pollinating wasps, fig-eating mammals and birds like the one that began our story.

There are between 750 and 850 *Ficus* species in the world. Such numbers mean they are nothing if not adaptable—they are known to live as epiphytes, hemiepiphytes, woody vines, shrubs and often as enormous trees throughout tropical and subtropical environments. The massive banyan tree—*Ficus benghalensis*—with its buttressed trunk and supporting roots, can grow to form a forest of its own creation; the Great Banyan Tree in Kolkata, India, covers about four acres. Closer to home is the largest banyan in the United States, in Lahaina, Maui, Hawaii—under whose shade I once had the pleasure of watching the construction of Polynesian canoes.

Fairchild alone has 33 different *Ficus* entries in our living catalog. And just a few miles south, in Bill Sadowski Park, is the National Champion strangler fig, a *Ficus aurea* that, at its last measurement in early 2014, reached 69 feet tall with a crown spread of 72 feet. Its original host, if the strangler began as an epiphyte, is long, long gone. 

LEFT

The enormous *Ficus aurea* National Champion strangler fig, last measured at 69 feet tall with a 72-foot crown spread.