

Tipularia

The Journal of the Georgia Botanical Society

Volume 34 • 2019



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Tipularia is published once a year by the Georgia Botanical Society to foster knowledge of and interest in the state's native plants and related subjects.

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ISSN 1090-1876

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Editorial information

Tipularia strives to combine the scientific authority of a botanical journal with the readability of a magazine. Some articles are assigned; unsolicited manuscripts are welcomed for consideration. *Tipularia* is unable to pay for articles or art, but there is no charge for publication of them.

Cover: Three Birds Orchid (*Triphora trianthophoros*), photograph by Bruce Roberts.

Three Birds at Home

The tiny Three Birds Orchid (*Triphora trianthophora*) is easily one of my favorite mid-summer flowering plants. The species might be small in size, but it makes up for that in mystery and beauty. This article describes a recent find of several small colonies of *T. trianthophora* at our home in Towns County, GA. Also discussed are some observations on this orchid's unusual synchronous flowering cycles.



A pair of Three Birds Orchid Flowers

Background

The Three Birds Orchid, also known as the Nodding Pogonia, is an unusual orchid of deciduous forests, ranging across much of eastern and central North America. The common name, Three Birds Orchid, is attributed to the flower's resemblance to three birds in flight. The flowers, typically white but occasionally found tinted pink or purple, are quite small, rarely reaching 2 cm. in size. The stems vary greatly in length, perhaps due to the local light and moisture conditions. In some instances, stems barely protrude from the surface of the leaf litter, while on other occasions they grow up to 20 cm. tall. The light flower color and marvelous flower shape often stand out against the dark shade of the forest floor.

The species is found in the United States from Maine west to Wisconsin and Nebraska, south to Texas and Florida. It also occurs in Ontario, Canada. It is uncommon throughout much of this range and is listed as endangered or threatened in Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Maryland, Ohio, Michigan and Florida. Although rare in many states, it can often be locally abundant. As with many orchid species, populations often vary greatly from year to year. The species has the ability to remain dormant underground for many years without sending up a shoot.

Colonies of these orchids may persist for many years as tuberoids (similar to tubers), never sending up a stem and never flowering. A colony in South Carolina has been reported to be over 125 years old! (and that was in 1979!) When plants do emerge and flower, the flowers remain open for only a day or so. All of the plants in a local colony will flower at the same time, increasing the chances of attracting pollinators.



A typical whitish flower, and a more unusual rose-tinted bloom

The Three Birds Orchid is secretive, but there is plenty of advice out there on when to go looking for the species. One recommendation offers that the best time to find the species in bloom is to search beech forests during the first week following the first drenching rain of August. That might be better advice in the northern states, where the Three Birds are more associated with beech forests than in the SE. The fact is, the Three Birds Orchid is extremely ephemeral, appearing for only a short period of time in late summer (typically from late July through August in northern GA and western NC). The floral beauty is fleeting; each plant typically produces flowers which remain fresh and viable for only a single day. Flowering tends to be synchronous, with most plants within a population blooming at the same time. This synchronized bloom may be an adaptation to ensure successful pollination. While a single bloom of such a tiny plant may not put on enough of a show to attract the appropriate pollinator, many plants blooming in concert provide quite an attraction. More details on the flowering of this species will follow shortly...

Max Medley's observations from 1974-1977 in Michigan and Indiana revealed two species of Sweat Bees to be the primary pollinators in those populations. I have observed small Sweat Bees in our orchids also, so they may well play the same pollination role in our Southeastern USA populations. Max's experiments also revealed that self-pollination was possible with these orchids.

An Exciting Find

For the past several years, my friend Don Hunter (accompanied by his wife Karen) and I have made late summer visits to the Coweeta Hydrologic Lab forest in western North Carolina, to (hopefully) catch the bloom(s) of *Triphora Trianthophora*. I say "hopefully", because, as already mentioned, these diminutive plants are not easy to catch in bloom, and the beautiful flowers only last for one day. Although I live relatively close (compared with many folks) to the Labs, it is still over an hour's drive each way, and we never knew for sure if we would catch the flowers in bloom.

One day in mid August of 2018, I was walking up the creek that runs below our property, making one of my semi-regular searches for new and interesting plants. At this time of year, exciting new finds there are few and far between. Coming back downstream, I spotted a colorful coral fungi that I wanted to photograph, and looked for a clear spot on the bank to set down my pack and retrieve my camera. Glancing down, the first thing I spotted was a pair of tiny white flowers. What? Is that what I think it is??? Three Birds Orchid plants! I couldn't believe my eyes! As I looked around, I could see a few dozen more. Unfortunately, the flowers were hanging limp, as they had bloomed a day or two before. But I was still quite excited, to say the least.

Continuing down the creek and returning to my Mule (4-wheeler), I took off my pack and placed it in the bed. Looking down as I walked to the driver's side, something caught my eye. It couldn't be! More Three Birds! There weren't as many here, and they were somewhat scattered, but it was another population, and even closer to our house. I couldn't believe my good fortune.

I could tell that these orchids had recently bloomed, and since they still had some remaining buds, I knew it wouldn't be long before the next flowering. Keeping an eye on them over the next several days, I noticed one day that the buds had raised from a horizontal position to nearly upright. I was hopeful that this indicated an impending bloom, and sure enough, the next day I was rewarded with a beautiful burst of delicate flowers. Mostly white, but many with petals/highlights of pink and purple hues. Being the final bloom of the season, it was not a prolific flowering, but I saw 25-30 flowers, and was not disappointed. Having earlier caught the season's "big bloom" at Coweeta Labs, I was well satisfied.



Observations on Triphora trianthophora

While certainly not common, these orchids may be less rare than has been reported. One reason for the sparse sightings is that they are almost impossible to detect when not in bloom. The tiny size and unobtrusive stems and leaves blend in perfectly with the other flora growing on the forest floor. Even if one is very experienced, it is only during the few days each summer that these plants are in flower that they can be readily seen.

A number of authors have speculated on the flowering irregularity of these orchids, with some years of abundant blooms, and others of sparse numbers. Several possible reasons for this periodicity have been published, with varying levels of agreement/disagreement among the experts. For reasons of space, I won't elaborate on those discussions here. In my experience, this seems to be a trait common to many orchids. I have not had enough long-term experience with this particular species to speculate on the reasons.

Another mysterious aspect of *Triphora*, the synchronous blooming of the flowers, has also been studied, but is still not well understood. As mentioned earlier, all of the mature buds on plants in a given area will open and flower on the same day. After a period ranging from several days to a couple of weeks, all of the mature buds in the colony will bloom on the same day again. This will happen a number of times during a season. In my short experience, that number has ranged from four-five times, although it has been reported to repeat as many as seven times in more northern climates. I have seen that the middle bloom cycles appear to be the most prolific as far as the number of flowers in bloom.

But this floral synchrony is more complicated than just consideration of a single timing cycle. Location of the plant colony adds another complex dimension to the equation.

My friend Jim Fowler regularly visits a Three Birds Orchid site in Pisgah National Forest, NC, and he has worked out a bloom prediction algorithm that seems to be accurate for that location. As outlined in his book on Wild Orchids of South Carolina, (and expounded upon in more detail on his web blog): "The plant usually blooms when the temperature decreases by ten degrees or more {over two consecutive nights}. Within 24-48 hours of this temperature change, the flowers begin to open and remain open for just a few hours." *[Note: Jim has more recently reduced the required temperature drop to 3 degrees.]*

When I first started visiting the Three Birds populations at Coweeta in 2017, I tried to time my visits using Jim's Pisgah predictions & subsequent visit dates. Invariably, the (Coweeta) bloom timing was off, sometimes by several days. Over the past two years' observations from my and Don Hunter's visits, I've determined that the Coweeta colonies are not "in synch" with the Pisgah blooming cycle. Close, but no cigar. Being approximately 45 miles apart (as the crow flies) and at different elevations, it did not come as a surprise that they were not part of the same geographic "zone" of floral synchronization.

On the other hand, the colonies I found near our home are only 16 miles (again, as the crow flies) from Coweeta, and at about the same elevation. Are they part of the same floral synchronization zone? Since I discovered the locations here on one of the last bloom cycles of 2018, I'd only had one data point to compare. Both populations indeed bloomed on the same day (Aug. 22, 2018) last year, and I was confident that these two sites were in synch. Now comes 2019. Due to a prior commitment, I missed seeing the first bloom of the cycle at either location, although I do know they were within a day of each other (if not the same day). I was ready for the second bloom of the season, having seen the rising flower buds here on the day prior. They flowered prolifically here on July 26. But the big Coweeta bloom was on the following day, July 27. Could a localized anomaly (like a heavy rain or ?) at one site have affected the timing? I know that the Coweeta area received several heavy downpours in the week prior to this bloom, while those storm cells continuously just missed our home. I guess I'll just need to collect more data before determining if these two sites are indeed in synch with each other or not... In addition, I hope to eventually develop a somewhat accurate prediction method for my location.

Since I am now able to observe these plants on a nearly daily basis, I have made several observations. One is that, during a given cycle, not every mature bud in a population will flower on "the day". Maybe 5% of the buds will not flower until the following day. Another observation is that the mature flower buds will rise to a vertical position on the day prior to blooming. Even though it's only one day, it's great to have some confirmed

advanced warning as to when the flowering will occur! One final observation concerns location of the orchid colonies. While they don't like wet feet, they seem to have an affinity for locations near water. Granted, this is a limited sample, but of the five *T. trianthophora* populations that I know of, all are either in sight of or within hearing distance of a watercourse.



Typical "drooping" bud position (l), and raised position on the day prior to blooming (r)

Regarding the timing of flower bloom, past literature has reported variously that the *Triphora* flowers opened at night and were closed by the next evening, or were open by noon and closed the same evening. My observations have been more in line with Max Medley's observations from the 1970s, with the flowers typically opening during mid morning (never before daybreak). I have also seen a few that were just opening at about 2:00 pm. The flowers I have seen are typically still open in late afternoon, but will be drooping by the next morning. A few of those "prior day" flowers may still be partially open and able to accept pollinators (and may still be somewhat photogenic).

One small "pet peeve" regarding these plants - The species epithet, *trianthophora*, translated from Latin means "bearing three flowers"; this refers to the three flowers often produced on each inflorescence. Around here, I seldom see the three-flower occurrence. Considerably more common are the "two-fers" or single blooms. I will often see a nice pair of flowers with a rising bud on the same stalk, and invariably that bud will bloom the following day. Unfortunately, the other pair has drooped by then, so I often berate the plant for not getting its act together and flowering as a trio!

So there you have it... If you're out walking in the woods during the summer doldrums, keep an eye out for these little beauties. If you know what to look for, you might be lucky enough to find some!

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Autobiography

Bruce Roberts grew up in Gloucester, MA. He received a BS degree in Civil Engineering from the University of New Hampshire in 1975. Moving to Georgia soon after, he began a 34 year career with Lockheed (now Lockheed-Martin) in the fields of Engineering, Quality Assurance and Management, with assignments ranging from the C-5 Cargo Transport to the F-22 Fighter. Since retiring in 2010, he has been able to devote more time to his hobbies, of which he has too many! Bruce and his wife, Elaine, moved from Cobb County to the mountains of Hiawassee in 2016, building a new home on land they have owned since 1994. Among his pastimes are photography, conservation and preservation, music, and outdoor explorations (of subjects ranging from botany, to waterfalls, to local and Native American history, and more.)

Note: The text of this article is reproduced here exactly as printed in the 2019 edition of *Tipularia*, The Journal of the Georgia Botanical Society. A few photos have been added that were not included in the original printed Journal version due to format limitations.