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STUDY REVEALS HAZARDS OF THE HIGH-WIRE LIFE FOR BROMELIADS

by John Barrat

(Reprinted from the September, 2010 issue of SMITHSONIAN SCIENCE published by the Smithsonian Institution, as first reprinted in the May/June 2012 issue of SEMBS, Bulletin of the Southeastern Michigan Bromeliad Society edited by Penrith Goff. Thanks, Pen.)

A common epiphytic plant that pulls the nutrients it needs to live out of thin air has been conducting a high-wire act in Panama. Wind-born seeds of the bromeliad *Tillandsia flexuosa* have long been lodging, sprouting and appearing to thrive in the grooves of aluminum-wire wrapped electric power lines. These plants grow unprotected in the blazing tropical sun using a thick layer of water- and nutrient-absorbing scales to pull sustenance from the air. Their roots hold them fast to the cable margin.

Recently, botanists Gerhard Zotz of the Smithsonian Tropical Research Institute and Stefan Wester of the University of Oldenburg in Germany decided to take a closer look at these high-wire bromeliads. They were interested to find out how the growth and survival rates of these plants on electrical cables compared to the growth and survival of plants of the same species growing in trees—their



Tillandsia flexuosa growing on electrical cables in Panama. Photo courtesy of Gerhard Zotz

natural environment.

During a two-year study the pair surveyed some 1,400 *T. flexuosa* specimens living on 1250 meters of electrical cable, as well as nearby plants of the same species growing on tree limbs. The cables were 8.25 millimeters in diameter and consisted of multiple aluminum wires woven around a single steel cable, giving them a rough surface upon which the seeds and plants can cling. Before their study the scientists observed that most of the cable-growing *T. flexuosa* lived on cables near roads, leading them to theorize that the dust kicked-up by cars and other vehicles provided adequate nutrients for the plants to flourish.

Although the high-wire *T. flexuosa* appeared to be thriving, Zotz and Webster found the cables were actually a hostile environment for the plants. *T. flexuosa* on power lines grew slowly, suffered a high mortality rate and were not very successful in establishing new recruits.

NEXT MEETING - Tuesday, October 2nd 2012 **promptly at 7:00 P.M.** at the [Ripley-Grier Studios 520 8th Ave. \(between 36th & 37th St\) Room 16K](#)

VIDEO OF HIGHLIGHTS OF WORLD BROMELIAD CONFERENCES FROM 1972 TO 2010. We'll show photos of society, nursery and artistic exhibits and great plants from every conference. Some of Sara Savitt's plants have been donated by her husband Isaac for sale at this meeting. Please bring in plants for sale and for Show and Tell.

NOVEMBER DATE CHANGE from Nov. 6th (Election Day) to Tues. Nov. 13th !

On electric cables the death of established plants greatly exceeded the recruitment of new plants from seeds.

For these bromeliads the primary problem with cable-life, the scientists found is a lack of water. While individuals growing on both cables and trees utilize rainwater, the zero water-absorbing properties of an aluminum cable combined with greater exposure to the sun and wind, make cable life for bromeliads highly risky. Even though dust from cars should provide an abundance of nutrients to the cable-living bromeliads, lack of water prevented them from



Tillandsia flexuosa growing on electrical cables in Panama. Photo by Gerhard Zotz

T. flexuosa on cables. Note bird on top wire. Photo Gerhard Zotz

taking advantage of this benefit.

In addition, the scientists found that even though the cables had a rough surface, the plants had a difficult time anchoring themselves to the

cable. Many of the plants disappeared during the course of the study, dislodged from the cables by wind and other natural forces.

The study, the first to examine the growth and survival of electric-cable growing bromeliads, was published recently in the Journal of Tropical Ecology.

EDITOR'S NOTE:

Tillandsia flexuosa (Swartz) is so-named because the leaves twist tightly around the plant as if flexed. It is ubiquitous, found in southern Florida, the Caribbean islands (West Indies) of Panama, Cuba, Jamaica, Dominica, Haiti, Puerto Rico, the Antilles, Trinidad, Tobago, Surinam and the Bahamas and Columbia, Guyana, etc. in northern South America.

It grows epiphytic from sea level to altitudes of about 1,500 feet. I have found *T. flexuosa* relatively easy to grow indoors provided that you don't let it dry out,

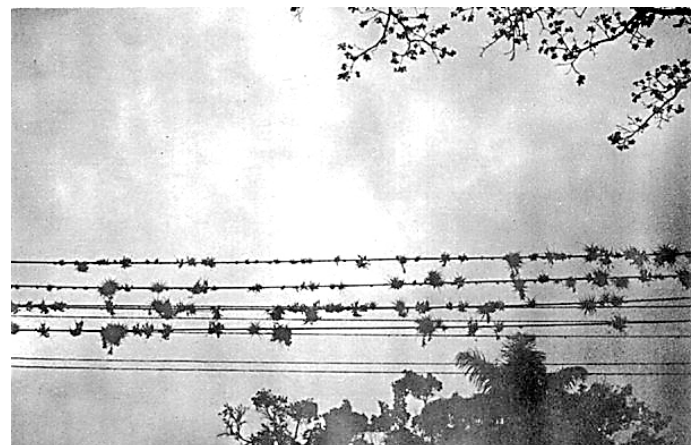
so soaking is recommended at least once a week. Unfortunately, it does not appear to be readily available from tillandsia nurseries, despite its ubiquity. See the photos of the plant below. There are some tillandsias that grow happily on high-wire electrical cables, particularly *Tillandsia recurvata*. See photo below of this plant growing on telephone wires in Brazil, taken by our own George Kalmbacher in 1970. It appeared in an early BSI journal (Vol. 4) then called The Bulletin. It did not officially become the JOURNAL of the Bromeliad Society until Volume 21 in 1971.



T. flexuosa



T. flexuosa inflorescence



T. recurvata on telephone poles, Brazil. From BSI Bulletin V. 4

TILLANDSIA MINUTIFOLIA (Donadio) - A valid, new Name for *Tillandsia bryoides* auct.

(Excerpted from an article by Sabina Donadio in *Darwiniana* V. 49(2) 2011. The abstract, affirming findings by Dr. Walter Till in 1989, is reprinted here because it explains the history and reasons for a change of name in English.)

“*Tillandsia bryoides* was sunken into the synonymy of *T. tricholepis* because all the elements of the lectotype... belong to the latter species. However, there are many vouchers from different herbaria... previously identified as *T. bryoides*, that in fact correspond to a new species of *Tillandsia* subgen. *Diaphoranthema*. This new species has yellow, sessile, solitary flowers and a glabrous floral bract, and grows in central Peru, Bolivia, and central and northwestern Argentina. This paper provides a valid name for this species, an illustration, distribution data, and a discussion of the relationships with its morphologically closest species.”



Tillandsia minutifolia -
formerly *T. bryoides*

“*Tillandsia bryoides* was validly described by J.G. Baker (1878) ...One year later, Grisebach (1879) modified the description of *T. bryoides* modified the description of *T. bryoides* based on material from “near Córdoba”, “near Tucumán” and “near Jujuy”, but describing longer leaves (8,5-10 mm vs 6,3-8,5 mm), shorter bracts (4,2-5,3 mm vs. 6,3-8,5 mm) and dismissing the possibility of 1-flowered inflorescences (2-3-flowered vs. 1-3-flowered)... About half a century later, Smith (1935) amended the description of *Tillandsia bryoides* because it “was described from a mixed sheet and the original description unfortunately contained both elements. One element had already been described as *T. tricholepis*, so that the description is amended here to fit the previously undescribed second element. The only definite correction is that the spikes never have more than a single flower instead of: ‘Flowers 1-3.’”

“Based on Smith’s (1935) statements and the data published in his monograph (Smith & Downs, 1977: 879) the original material on which Baker had described *T. bryoides* was a mixture of individuals of different taxa, and Smith established what part of the original material corresponded to his amended description of *T. bryoides* and what part corresponds to *T. tricholepis*. Smith and Downs (1977) stated for the first time that this lectotype (as “holotype”) is housed in BM (the Clayton Herbarium, U.K. -Ed) with one duplicate (“isotype”) in M (State



Tillandsia tricholepis small leaf form
courtesy fcbs.org . Photo by Olf Drechsel

Herbarium, Munich - Ed). These two specimens as well as further duplicates... all turned out to be *T. tricholepis*.”

“Based on the amendment and commentaries made by Smith (Smith, 1935; Smith & Downs, 1977), it can be inferred that at least part of the voucher housed in BM included elements of *T. bryoides*, in agreement with the original description published by Grisebach in Baker (1878) and amended by Smith (1935). But when Till (1989) looked for the lectotype of *T. bryoides* in BM, he only found... elements of *T. tricholepis*. The study of the duplicate kept in M... and another one found in MPU revealed that they both include only elements of *T.*

tricholepis... “This search for isotypes of *T. bryoides* only produced two old specimens... and they only include elements of *T. tricholepis*. All these facts support the inclusion of *T. bryoides* into the synonymy of *T. tricholepis*, already suggested by Till (1989).”

“However, there is still a taxon of *Tillandsia* subgen. *Diaphoranthema* from Argentina... Peru... Bolivia and... Paraguay, with yellow, sessile, solitary flowers and a glabrous floral bract... known as *Tillandsia bryoides*... that Till (1989) distinguished as *T. bryoides* auct. This paper provides precisely a valid name for that taxon, an illustration, and a discussion of the relationships with its morphologically closest species...”

Observations. *Tillandsia minutiflora* is morphologically close to *T. tricholepis*, and differs by the shorter, slender stems, and narrower leaves with 3-nerved sheath, 1-nerved bracts (both peduncle and flower), inflorescence always 1-flowered, with a very reduced peduncle which does not elongate with fruit ripening, and a glabrous floral bract, shorter than the sepals.”

“After the study of numerous vouchers, and cultivation of abundant material of *T. tricholepis* there is a strong morphological support to consider *T. pedicellata* as a valid independent taxon from *T. tricholepis* because the former has deep purple flowers, sepals glabrous and 3-nerved, bracts 1-nerved, and leaves with a 3-nerved sheath...”

Editor’s Note: The long-leaf form of *T. tricholepis* shown in the photo at the bottom of this column is different in appearance from the form shown in the photo at the bottom of page 3. For the benefit of those readers who are not familiar with identification lingo, I sum up the gist of the abstract:

In its long taxonomic history, including its description in Smith & Downs 1977 Monograph, *Tillandsia bryoides* contained elements of two different taxa or species. Depending on the particular plant you were looking at, it might be *T. tricholepis* or it might be *T. bryoides*. Dr. Smith’s analysis of *T. bryoides* was based in part on specimens that were housed in various herbaria, that upon later, closer examination all turned out to be *T. tricholepis*. So *T. bryoides* appeared to be synonymous with *T. tricholepis*.

Part of Dr. Smith’s records for the plant called *T. bryoides* also contained elements that constituted a different species from *T. tricholepis*. **But**, the name *T. bryoides* could not be used for it because its descriptive history included elements of both plants, so it had to be redescribed with a new name. Sabina Donadio has provided such a new description which was confirmed by the eminent taxonomist and molecular biologist, Dr. Walter Till. I trust this simplified summary will make sense to you.)

George was the Chief Botanist of the Brooklyn Botanical Gardens and the author or co-author of many books on bromeliads (*Bromeliads: A Descriptive List of Genera and Species...*, and *Bromeliads: Exotic House Plants*), sinningias, gloxinias, flowers (consultant for *Flowers of the World* and *A Color Guide to American Gardening*), *Tree Trails in Prospect Park*) and many other books, 17 articles for the BULLETIN and JOURNAL of BSI and for BROMELIANA. *Tillandsia kalmbacheri* and *sinningia cardinalis* ‘George Kalmbacher’ were named for him.



George Kalmbacher instructing former President Ed Sard at the old Bromeliad House in the Brooklyn Botanical Gardens, in June, 1988.



Tillandsia tricholepis long leaf form



Tillandsia kalmbacheri
photo by Renata Ehlers,
courtesy fcbs.org

N E W S and N O T E S

GEORGE KALMBACHER - I referred to “our George Kalmbacher” as the photographer of the picture of *Tillandsia recurvata* on telephone wires in Brazil in 1970 (pg 2). Only a few members will remember he was a charter member and a President of our Society, and a Director of BSI for many years.

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