FLORIDA WEST COAST BROMELIAD SOCIETY

1954-2016

Celebrating over 62 Years in Bromeliads

floridabromeliads.org

December 2016 Newsletter

NEXT MEETING

Date & Time:
Tuesday, December 6, 2016
Doors open at 7 pm; meeting starts at 7:30

Location:
Good Samaritan Church
6085 Park Boulevard
Pinellas Park, Florida 33781

Holiday Party

As usual, the night of our regularly scheduled December meeting is turned over to our annual Holiday Party. There will be no business meeting, no speaker, no general raffle table, and no friendship plant table. What it will be is a lot fun with great food, the company of other bromeliad lovers, plant giveaways, a plant swap and a special raffle. Our members are noted for the food they provide for our parties and we look forward to seeing all and eating the culinary delights, from appetizers to desserts, you will provide this year.

LAST MEETING HIGHLIGHTS

Program

In his presentation titled *The Zika Virus and Bromeliads*, **Rick Hunter**, Ph.D., gave us his perspective as a health professional on the Zika virus that has been much discussed and reported in the media since last spring. The information presented about the Zika virus is available on the Centers for Disease Control and Preventions website at www.cdc.gov/zika. Dr. Hunter also discussed the relationship among bromeliads, mosquitoes, and Zika, along with measures bromeliad growers and other gardeners can take to reduce the likelihood of becoming infected by the virus.

[Editor's Note: The summary below of the speaker's presentation was based on a recording Nicole Matwijczyk made of the talk and on copies of the slides that the speaker generously provided. Information regarding the types of mosquitoes that breed in Florida bromeliads is from studies conducted by Dr. Howard Frank, Professor Emeritus (Entomology) of the University of Florida,]

Zika Virus Basics

- Zika is a viral illness that has been known for 70 years. Until 2007 very few cases of the virus were reported in humans.
- Zika is transmitted via mosquito bites, sexual activity (typically from man to woman), blood transfusions (now screened by testing), and organ tissue transplants (also screened by testing).
- About 2015 Zika showed up in South America and is now in the US, most likely transmitted by tourists from infected areas.
- Zika is little threat to adults and is believed to be an uncomplicated infection with self-limited symptoms that do not have long-lasting complications.
- Eighty percent of people who contract Zika have no symptoms and the remaining 20% have only mild, flu-like symptoms that can last up to a week.
- Zika is a serious health threat the fetus of a pregnant woman and to women seeking to become pregnant. Zika infection during pregnancy can cause a fetus to have a birth defect of the brain called microcephaly and other problems, such as defects of the eye, learning deficits, and impaired growth.
- Once infected, a person is likely protected from future infections.
- It is believed that the Zika virus can remain in the body for up to six months.
- There is no specific medicine to treat Zika; treatment is similar to that for a flu virus.
- There is currently no vaccine to prevent Zika but progress with developing one is promising.

Mosquitoes and Zika

- The mosquito life cycle is in four stages: adult, egg (laid in standing water), larva (hatches from the egg), and pupa (grows in the water and emerges from the water as an adult).
- Mature mosquitoes have a life span of about two weeks, depending on environmental conditions.
- Two species of non-native mosquitoes found in Florida, *Aedes aegypti* and *Aedes albopictus*, can transmit Zika and other diseases such as dengue, West Nile virus and chikungunya. *A. albopictus* are not as efficient in spreading Zika as *A. aegypti.*

Mosquitoes and Bromeliads

- Mosquitoes need standing water to reproduce, such as the water held by many plants, including most, but not all, bromeliads.
- Bromeliads provide no more mosquito habitat than the numerous containers found in home garden settings and are not inherently a problem.
- Results of research conducted by Dr. Howard Frank concluded that about 99% of the population of mosquitoes in bromeliads is limited to two species in the genus *Wyeomyia*. These mosquitoes are native to Florida and do not transmit diseases. Less

than half of the remaining 1% consists of *A. aegypti* and *A. albopictus* that do transmit human disease.

- *Wyeomyia* prefer very small amounts of clean, clear water, such as that found in bromeliads, fly only about 20 feet from the host bromeliad, and tend to outcompete and starve out *A. aegypti* and *A. albopictus.*
- While the *Aedes* species might breed in bromeliads, they are not their favorite habitat. They more commonly breed in other types of water containers and in dark water laden with organic debris.

Controlling Mosquitoes

- Eliminating standing water in yards and landscapes will reduce local mosquito populations.
- Keeping grass trimmed and vegetation cut back will reduce places where adult mosquitoes hide during the heat of the day.
- Suggestions for controlling mosquitoes in bromeliads:
  - Once a week empty the water out of bromeliads or flush out and refresh the existing water using a garden hose.
  - Keep bromeliads free of grass cuttings and other organic debris.
  - Sprinkle water in bromeliads with a product that contains the bacteria *Bacillus thuringiensis israelensi* (Bti). It is toxic only to mosquito larvae and harmless to other living things. When the larvae hatch they will eat the Bti and die. BTi is sold under the brand name 'Mosquito Bits' in two forms: Mosquito Dunks and Mosquito Bits.

    - ❖ **Dunks** are useful in open bodies of water such as vacant pools and can be broken up to treat smaller surface areas. They have a time-release feature and last approximately 30 days in the water.

    - ❖ **Bits** are useful for smaller, hard to reach locations such as bromeliads and tree holes. They also have a time-release formula but last only approximately 7-14 days and need to be applied more often but offer quick results.

  - Some suggest adding a drop of vegetable oil, lemon oil, or soap to the water surface in bromeliads to break the water surface tension so larvae cannot breathe at the water surface. Others suggest adding a pesticide to the water in the bromeliads. These methods are not as desirable because they can damage bromeliad leaves.
  - Whatever steps are taken to rid bromeliads of mosquitoes, be aware that those methods will also be killing the friendly *Wyeomyia* mosquitoes that outcompete the *Aedes*.

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Dr. Hunter's talk was a timely topic, in consideration of the swirl of local media coverage about the Zika virus taking place this year. The reporting on occasion bordered on hysteria and included erroneous statements to the effect that bromeliads can be the primary breeding haven for mosquitoes that transmit the virus. This led to significant impact on the reputation of bromeliads making them less that desirable in the eyes of many including the City of Miami Beach. That city's mayor ordered all bromeliads located on city properties, including the city botanical gardens, removed for disposal. A number of homeowners in southern and central Florida followed suit and removed all bromeliads from their yards. In that same time period, many Florida growers reported a reduction in sales of their bromeliads. Some bromeliads growers selling at local plant sale events reported hearing people passing by their booth to say "those [bromeliads] are the Zika virus plants".

What has been missing from the public discussion is science-based information regarding the ecology of mosquitoes in bromeliads that tells us only some mosquitoes breed in bromeliads and very few transmit human diseases. Dennis Cathcart of Tropiflora Nursery, in collaboration with Dr. Howard Frank, prepared and printed a flyer that summarizes results of Dr. Frank's research and the role bromeliads play—or rather do not play—in transmission of the Zika virus. A copy of that flyer is attached to this newsletter.

2017 Officers and Trustee Election

At the November meeting members approved the following slate of officers for our 2017 Board of Directors:

President	Dick Dailey
Vice President	Brian Corey
Secretary	Nancy Dailey
Treasurer	Gary Lund
Trustee (three-year term)	Judy Lund (3-year term, 2017 through 2019)

SHOW AND TELL

Reported by John Edwards

John Edwards	*Nidularium billbergioides*, possibly
Franne Matwijczyk	*Aechmea* 'Friederike' cv of 'Fascini' *Neoregelia compacta* *Aechmea* victoriana var. discolor
Susan Sousa	*Aechmea* 'Royal Wine'; (*miniata v. discolor* X *victoriana v. discolor*)

THIS AND THAT

FWC Bromeliad Social

Dick and Nancy Dailey hosted a Florida West Coast Bromeliad Social at their weekend home in Homosassa on Saturday, November 19, and it was a lovely event. An article about it will be included in next month's newsletter (January 2017).

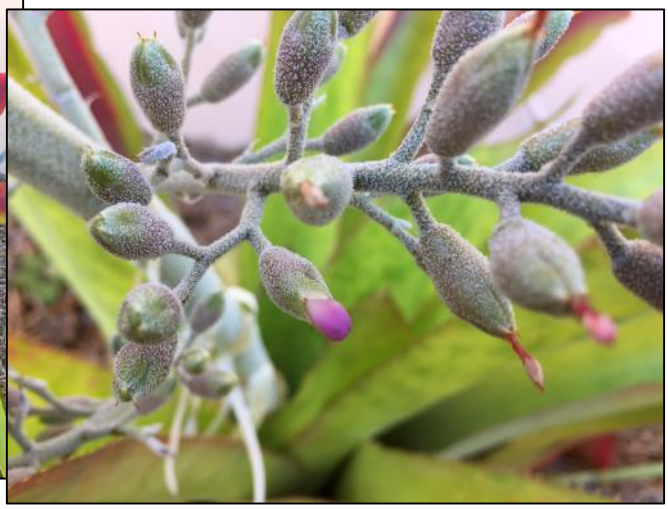
BLOOMING THIS MONTH

Gary Lund submitted these pictures of two of his bromeliads in bloom in his garden.

Aechmea kuntzeana

Full inflorescence; no flowers yet

Six weeks later, terminal flowers open



Aechmea mexicana

COMING EVENTS, 2016-2017

December 3-4, 2016, Caloosahatchee Bromeliad Society Sale
Terry Park, 3451 Marion Street, Fort Myers (bprevattpcc@aol.com)

March 11-12, 2017, Leu Gardens Spring Plant Sale
Harry P. Leu Gardens, Orlando, FL (http://www.leugardens.org)

March 25-26, 2017, GreenFest Plant Sale
University of Tampa, Tampa, FL (friendsofplantpark.com/greenfest)

April 22 and 23, 2017, Green Thumb Festival
Walter Fuller Park, St. Petersburg, FL (stpeteparksrec.org/greenthumb)

August 4-6, 2017, Bromeliad Extravaganza®
Sheraton Tampa East Hotel, Tampa, FL; Hosted by the Bromeliad Guild of Tampa Bay, Tampa, FL (bromeliadsociety@juno.com)

2016 FWCBS BOARD OF DIRECTORS

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Webmaster: John Edwards, JOHNRN56@aol.com

MOSQUITOES IN BROMELIADS - What's the Real Story?



The Zika scare has added an element of hysteria to a problem that has been with Florida since people first inhabited the state. Face it; mosquitoes are a fact of life in Florida (and most inhabited areas of the Earth). Historically there have been few mosquito vectored diseases affecting humans in Florida with some outstanding exceptions: Yellow Fever, Malaria, Dengue to name some, with Yellow Fever having been eradicated from our hemisphere and Malaria and Dengue very rare in Florida. Enter Zika with its associated birth defects in humans, add sensational publicity and you have a wave of hysteria that leads to many irrational decisions on the part of the public as well as our political leaders.

A complex problem rarely has simple causes or solutions. The fact that mosquitoes breed in standing water and that many bromeliads retain water between their leaves has led to a over simplistic 1+1=2 logic. To make any sense of the issue, one must have some facts. The facts are that only some mosquitoes breed in bromeliads and only some of these can potentially vector human diseases. The incident of success of these disease vectoring mosquitoes in completing their lifecycle in a bromeliad is a big factor. Knowing how mosquitoes breed and their requirements to survive is all important to understanding the potential role that bromeliads might play in the spread of mosquito borne diseases.

The article below, written by Dr. J Howard Frank, Professor Emeritus, University of Florida, one of the world's leading experts in the biology of mosquitoes in bromeliads and author of many papers on the mosquito-bromeliad connection, is a short but concise overview of the Zika (and other mosquito borne diseases) scare related to bromeliads. Understanding the life cycle of the types of mosquitoes that inhabit bromeliads in Florida and those that can carry diseases is of critical importance and concern for making decisions in this hot-button issue. (Dennis Cathcart, Tropiflora, LLC, Sarasota, FL)

An Ecology-Based View of Mosquitoes in Bromeliads

Dr. J Howard Frank, Professor Emeritus, University of Florida

In nature in Florida: A few native epiphytic bromeliad species impound rainwater in their leaf axils. The northern limit of their distribution is a line roughly between Volusia County and Hillsborough County. Immature stages of two species of the mosquito genus *Wyeomyia* often inhabit these water-filled leaf axils. The life cycle of all mosquitoes is ADULT-EGG-LARVA (4 larval growth stages [sizes])-PUPA-ADULT. Adult females of these mosquitoes will bite people and rabbits, but do not transmit any disease to people. They bite in daylight hours, peaking in late afternoon, not at night. You may encounter *Wyeomyia* mosquitoes in many state parks, and perhaps also in your own yard. Occasionally an interloping mosquito, *Toxorhynchites rutilus*, lays eggs into these leaf axils, but it normally inhabits dark water-filled rot-holes in trees. Unlike other mosquitoes, its adult females do not bite; instead its larvae gain their protein by feeding on pest mosquito larvae!

How do *Wyeomyia* mosquitoes live? Adult females take blood; males and females drink plant nectars. Eggs and pupae do not feed. Dead leaves and twigs and seeds from the tree above fall into the leaf axils, especially during hard rain which adds leachates from the tree canopy and, on breakdown by minute bacteria and fungi, provides food to the bromeliad and to mosquito larvae. Larvae filter-feed on these resources. Typically the water is very clear because the *Wyeomyia* larvae and bromeliad remove nutrients – so clear that it was used for drinking water by early explorers (it would hurt nobody to drink water with some mosquito larvae). Very many *Wyeomyia* mosquito larvae die due to competition with each other for food (shown by University of Florida laboratory experiments).

Now we grow exotic bromeliads in Florida, so what is the difference? In 1978-1979, a University of Florida survey was conducted in four urban areas of Florida, of mosquito immatures in exotic bromeliads planted in the ground. The reason was the spread of Dengue fever types II, III, and IV, transmitted by the mosquito *Aedes aegypti* in the Caribbean, a threat to Florida. The question was: what is the prevalence of *Aedes aegypti* in exotic bromeliads? To answer the question, the apparently commonest bromeliad in urban areas, *Billbergia pyramidalis*, was surveyed. Cities surveyed included the Daytona Beach area, Tampa, Vero Beach, and Miami, in collaboration with local Mosquito Control Districts. The result was that 98.8% of all the mosquito immatures were *Wyeomyia,* which do not transmit any diseases to humans; less than half of 1% were *Aedes aegypti* , and about 0.7 % *Culex quinquefasciatus*, both of which were interlopers in a bromeliad habitat that had been taken

Continued on reverse side….

over by native Wye*omyia* mosquitoes. This suggested that *Aedes aegypti* were but a trivial component of mosquitoes in *Billbergia pyramidalis* bromeliads. Furthermore, the numbers of immature mosquitoes present do not show the **outcome** of extreme competition among mosquito larvae – which is shown only by numbers of mosquito pupae (or emergent adults). The numbers of *Aedes aegypti* surviving to the pupal and adult stage in bromeliad leaf axils is effectively zero (0%).

Hysteria due to the presence of Zika virus in Florida. Belatedly in 2016, some people have realized that mosquito larvae occur in bromeliad leaf axils in Miami. Apparently they do not realize that studies on the subject were performed in 1978-1979, much less the results of that study. Their whistle-blowing is inappropriate except in the special circumstance that people have allowed the pollution of the water in bromeliad leaf axils. What pollution?

A) do not allow grass clippings from a lawnmower to get into the bromeliads. These clippings rot and enrich the water, making it appropriate for *Aedes* and *Culex* mosquitoes.

B) do not allow the flowers of *Neoregelia* bromeliads to decompose in the water for the same reason. For ease of maintenance, it is best not to grow masses of close-packed *Neoregelia*.

C) do not use the insect growth regulator methoprene (sold as brand name Altosid) nor the bacterium *Bacillus thuringiensis* **serovar** *israelensis* (sold under at least two brand names) because it kills all mosquito larvae, including the beneficial *Wyeomyia* as well as the bad ones such as *Aedes* and *Culex* mosquitoes and the dead bodies of the mosquito larvae they kill will rot and eventually will provide nutrient to living *Aedes* and *Culex* mosquitoes.

Summary: ***Wyeomyia* mosquito females prefer to lay their eggs in pale green bromeliads and their immature stages represent 98.8% of all mosquitoes in a typical bromeliad in urban habitats in southern Florida. *Aedes aegypti* females (vectors of dengue, Chikungunya, Zika, and yellow fever) prefer to lay their eggs in black containers of water (think scrap tires and saucers under plant pots). *Wyeomyia* are highly adapted to life in water in bromeliad axils: under conditions of intense competition with *Wyeomyia* in bromeliads, *Aedes aegypti* larvae die. If you think you need to reduce numbers of mosquito larvae in your bromeliads, prefer to use pressure from a garden hose with a suitable nozzle to wash out nutrients (thus starving the mosquito larvae even more) and maybe wash out some of the mosquitoes themselves. Keep the water in your bromeliad leaf axils so clean that you would be prepared to drink it.**

A short selection of pertinent publications on mosquitoes by Dr. J.H. Frank:

Frank, J.H., Curtis, G.A. 1977. On the bionomics of bromeliad-inhabiting mosquitoes. III. The probably strategy of larval feeding in Wyeomyia vanduzeei and Wy. medioalbipes. Mosquito News 37:200-206.

Frank, J.H., Curtis, G.A. 1982. Bionomics of the bromeliad-inhabiting mosquito Wyeomyia vanduzeei and its nursery plant Tillandsia utriculata. Florida Entomologist 64: 291-506

Frank, J.H., Lynn, H.C., Goff, J.M. 1985. Diurnal oviposition by Wyeomyia mitchellii and W. vanduzeei (Diptera: Culicidae). Florida entomologist 68: 493-496.

Frank, J.H. 1986. Bromeliads as ovipositional sites for Wyeomyia mosquitoes: form and color influence behavior. Florida Entomologist 69: 728-742.

Frank, J.H., Stewart, J.P., Watson, D.A. 1988. Mosquito larvae in axils of the imported bromeliad Billbergia pyramidalis in southern Florida. Florida Entomologist 71: 33-43.

Gettman, A.D., Frank, J.H. 1989. A method to reduce Wyeomyia michellii eggs in Billbergia pyramidalis bromeliads. J. Florida Anti-Mosquito Assoc. 60:7-8

Electronic (WWW)publications. Note that all those on University of Florida servers have been updated since their original publication (and some of the updates have been considerable) so that they may be thought of as works in progress.

Frank,J.H. 1996. A bibliography of the aquatic biota in bromeliads phytotelmata. Published on WWW at http://entnem.ifas.ufl.edu/frank/BromeliadBiota/bromfit.htm

Frank, J.H. 1996. Bromeliad-inhabiting mosquitoes in Florida. Published on WWW at http://entnem.ifas.ufl.edu/frank/BromeliadBiota/mosbrom.htm

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