Hot Topics from the URI Consumer Horticulture Educator

The following science-based articles may help you answer questions from the public. Rosanne Sherry, URI Consumer Horticulture Educator, recommends you read them to help sharpen your own gardening and educator skills!

1. **From Xerces Society Enewsletter September 2016**

http://www.xerces.org/blog/pollinator-conservation-in-agriculture/

2. **From Tropical Topics E newsletter Thursday September 22, 2016**

Rosie's note. Pass this info onto your friends and family who live in Florida.

Bromeliads as the Bad Guys by Ellen Weeks, Editor-at-Large

Bromeliads are getting a seriously bad rap as the plant accomplice to Zika, capturing insect-sized pools of water in its foliage and thus providing water in which mosquitoes carrying the virus can reproduce. An NBC article posted online on September 2 carried this headline: "Zika Mosquitoes May Have Bred in Bromeliads, Florida Officials Say." Now, if that isn't a headline created to cause alarm, I don't know what is. They neglected to mention that mosquitoes also breed in just about any place where water collects, such as trash bins, potholes and the like. The piece goes on to say officials are "ripping out the moisture-loving bromeliads and asking residents to do the same." That's not good and causes undo landscape-destroying hysteria.

Yes, bromeliads have been shown to be places where lots of different types of mosquitoes breed. That's not new. What's new is the spread (via a specific mosquito, *Aedes aegypt*i) of a virus that at its worst can cause devastating birth defects. Controlling *Aedes aegypt*i has become a public health emergency in Florida—at the expense of a popular landscape plant that can also be found growing in the wild.

The folks that should be (and are) most alarmed about this botanically related aspect of the Zika situation are bromeliad growers. To address it, two meetings were held this week for bromeliad growers in the Miami-Dade region. Dr. J. Howard Frank, professor emeritus of the University of Florida, attended the meeting held Tuesday at the Miami Beach Botanical Garden. Dr. Frank is the go-to expert when it comes to mosquitoes and bromeliads, and I reached out to him to get his take on the bromeliad-Zika issue.

Below is Dr. Frank's response:

As an insect ecologist, I studied mosquito immatures in Florida native epiphytic *Tillandsia utriculata* (in 1972-1985 when I worked at Florida Medical Entomology Laboratory in Vero Beach, Florida). Nobody has repeated such intensive studies:

1) I learned a great deal about how they live. I **never** found mosquito immatures other than (a) native*Wyeomyia vanduzeei*, (b) *Wyeomyia mitchellii* and, (c) *Toxorhynchites rutilus*. The last is a predatory mosquito whose adults do not take blood but gain their protein by eating other mosquito larvae primarily in rot-holes in trees: it is an interloper in bromeliad leaf axils. *Wyeomyia* mosquito larvae inhabit a nutrient-deficient ecosystem in which they filter-feed on microscopic bacteria and fungi that in turn feed on decomposing leaves, twigs, and pollen in the water in bromeliad axils.

2) The "standing crop" of mosquito immatures in the water builds up during the rainy season but then overshoots the resources available. The mosquito larvae present undergo **intense** competition for food, then the population crashes. Few survive. *Wyeomyia* mosquito larvae can survive this starvation for **many** weeks waiting for additional food input caused by rainfall-induced food input. They cannot develop in fewer than 2 weeks (if you add excess food, they die). In contrast, larvae of *Aedes* and*Culex* mosquitoes die unless the food resource is rich enough to allow them to develop within 2 weeks(typically, with rich resources, they develop within a week).

3) Dengue fever type I, transmitted by the mosquito *Aedes aegypti*, had been known in Florida decades earlier, but had been eradicated by mosquito control agencies. About 1978, dengue types II, III and IV began to spread in the Caribbean. There was a risk to Florida, and I undertook to investigate the presence of *Aedes aegypti* in ornamental bromeliads. I chose *Billbergia pyramidalis* as the study plant because it seemed be the commonest in urban habitats in central and southern Florida. Samples were taken from the water in axils of *B. pyramidalis* **growing in the ground** in 4 urban areas in Florida, with help in 3 of them from personnel of local mosquito control agencies (east Volusia County, Hillsborough County and Dade County).

4) The "standing crop of mosquito eggs+larvae+pupae" in *Billbergia pyramidalis* leaf axils, sampled during 12 months in 1978-1979 (about 300 samples per city), at sites in 4 cities (East Volusia County [Daytona Beach and neighboring areas], Tampa, Vero Beach and Miami) yielded 32,654 *Wyeomyia*mosquitoes, 169 *Aedes aegypti*, 232 *Culex quinquefasciatus*, 9 *Toxorhynchites rutilus*, and 8*Corethrella appendiculata* (this last is now generally assigned to the family Chaoboridae, but was sometimes assigned at the time to Culicidae [mosquitoes]). I calculated that each plant would produce 107 *Wyeomyia* mosquito adults per year. Wyeomyia adults are known to bite rabbits and people, but they have **never** been shown to transmit diseases to people in Florida.

5) What about production of *Aedes aegypti* mosquitoes, the vectors of various diseases? The standing crop of immature mosquitoes showed only one half of one percent were *Aedes aegypti*. But that's only

the standing crop—a much more important indicator is the percentage **after** larval completion, as measured by the number of pupae. My studies in those years showed that *Aedes aegypti* larvae cannot withstand starvation beyond about 2 weeks, **so cannot survive competition with** *Wyeomyia*mosquitoes.

6) I conclude that, if your bromeliad leaf axils are adequately occupied by *Wyeomyia* mosquito larvae, they should produce NO *Aedes aegypt*i adults.

7) How can your bromeliads create a problem?

A) Your bromeliads receive input from lawn clippings from a lawnmower. The result is stinky water that attracts egg-laying by *Culex* and *Aedes* mosquitoes (and repels *Wyeomyia*). Don't let this happen.

B) Your *Neoregelia* bromeliads flower, and then you allow the flower to decompose in the central "cup" of the bromeliads. The result is stinky water that attracts egg-laying by *Culex* and *Aedes* mosquitoes (and repels *Wyeomyia*] Don't let this happen—cut out the dead flower before it decomposes.

C) Avoid any other circumstance that adds to the nutrient content of water in bromeliad leaf axils (keep it clean—remember that early explorers in Florida used bromeliad leaf axils as a source of drinking water—keep them so clean that you would be prepared to drink from them).

8) All of this means that *Wyeomyia* mosquito larvae should suppress *Aedes* and *Culex* mosquito larvae in almost all circumstances. If your plants have a good population of *Wyeomyia,* you should have no problem with a Zika vector.