Scientists seek an answer to an existential question for an East Texas hibiscus

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Since 1997, a shrubby perennial found only in East Texas has been on a waiting list to be officially declared by the U.S. Fish and Wildlife Service as threatened under the Endangered Species Act. A ruling on the fate of the Neches River rose-mallow is expected by 2016 under a settlement agreement between the feds and a conservation group. If the plant is listed as threatened, it will become eligible for government-funded restoration. But the future of the white-petaled, ruby-throated hibiscus may hinge on its past: The jury is still out on whether the showy plant is actually its very own species.

Researchers at Stephen F. Austin State University in Nacogdoches, Texas, have set out to determine once and for all whether the Neches River rose-mallow, officially known as *Hibiscus dasycalyx*, is a unique species or a hybrid of the species *Hibiscus laevis* or *Hibiscus moscheutos*.

Laura Baker, a biotechnology graduate student, has been isolating genetic markers for each species, and she will present her most recent findings on the matter on Tuesday, April 23, at the annual meeting of the American Society for Biochemistry and Molecular Biology, which is being held in conjunction with the Experimental Biology 2013 conference.

"Preliminary studies from our lab suggest that the *H. dasycalyx* indeed is its own species due to the fact that genetic fingerprint analyses cluster the *H. dasycalyx* with other *H. dasycalyx* among different populations, regardless of the geographic location," Baker says.

This means that the *H. dasycalyx* has a unique DNA profile from that of *H. laevis* or *H. moscheutos*, making it a separate species, Baker says. If *H. dasycalyx* were a hybrid between the two, the DNA profile would be some combination of the two species.

Baker continued: "We have found only a few hybrids that share genetic markers with *H. laevis*, along with many markers unique to *H. dasycalyx*. These findings are important because, when this study is finalized, we will be able to restore the *H. dasycalyx* to its native habitat and have hundreds of genetic markers that can be used to monitor the *H. dasycalyx* gene flow for generations to come, ensuring its survival."

The Neches River rose-mallow, believed to have been first identified in 1958, is found in only a few counties in East Texas, usually near standing water. It coexists with *H. laevis*, also known as the halberdleaf rose-mallow, and *H. moscheutos*, also known as the wolly rose-mallow.

Populations of the Neches River rose-mallow have decreased substantially over the years – and in fact have disappeared entirely from sites where they were documented in decades past. "At present, it's found at two conservation sites and at only a few remaining natural sites," says Beatrice Clack, the associate professor overseeing the research project.

A number of factors are at play in the rose-mallow's decline, including the use of herbicides and the grazing of livestock. The U.S. Fish and Wildlife Service has proposed designating about 188 acres in East Texas as critical habitat for the plant.

Clack's team is using polymerase chain reaction technology to make copies of specific nucleic acid sequences from the three plants. Once the DNA is amplified, the team can assess whether the sequences in the plants' genomes are shared or unique. "The more similar the two hybrid

plants are to each other, they will have more shared polymorphs," Clack explains. "The greater the number of unique polymorphs, as between *H. laevis* and *H. moscheutos*, the more likely a plant is a distinct species."

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