

**TINKER Grant Student Research Reports
Summer 2016**

Can human selection of ethnobotanical plants enhance phenotypic variation? The case of the calabash tree (*Crescentia cujete*) in Cuba & Dominican Republic

By Betsabé D. Castro Escobar

-INSERT Picture 1-

When I was little, my mom always told me not ride in a car with strangers. Still, there's something very appealing that brings four strangers together to do road trip across a whole island while being exposed to the unpredictable nature of being on the road. That something...is plants!

Cuba, legendary for its politics and cigars, guards some of the best natural keep secrets in the Caribbean. With the highest biological endemism rate in the Caribbean, more than half of Cuba's plants and animals are found nowhere else on the planet. Dominican Republic, well known for baseball and bachata music, is a highly forested and agriculturally productive island. There are many similarities and differences shared among these two countries. Cuba and Dominican Republic are the largest islands in the Greater Antilles and seem to have well preserved their traditions, culture, and ethnobotanical knowledge. As a biologist interested in studying trait evolution, variation, and plasticity in plants of cultural and ethnobotanical significance where humans could act as selective pressures for such plants, these two islands seem like very promising field sites. Hence, in the midst of this past summer 2016, I embarked on a Caribbean journey to identifying potential field areas for my work, determine distribution patterns of my plants of interests, see if there is any distinct and observable variation in those plants that could be human mediated, and lastly, network extensively with local scientists that could provide me support or might be interested in collaborating for my project.

-INSERT Picture 2-

The model plants explored for my study are the *Crescentias* (calabash tree, güira, higüero), a genus of six species of flowering plants in the family Bignoniaceae. Of the five species found in the Caribbean, four are present in Cuba and Dominican Republic. *Crescentia cujete* is the most widely spread, found in both islands, all the Caribbean, Central and South America. *Crescentia mirabilis* is endemic to Cuba and classified as an endangered species. *Crescentia alata*, native to Central America, has been introduced to both Cuba and Dominican Republic. *Crescentia lineriofolia* is native to the Dominican Republic and Puerto Rico. In situ, on each island I also observed some hybrid individuals in different locations that seem to be interesting for further investigation. The calabash tree species are moderate-size trees (3 - 5m) that are highly

branched, with verticillate leaves that range size and shape, and a typical inflorescence that holds 1 or 2 cauliflorous and bilabiate flowers that are light yellow or green with red on some cases. They produce large, more or less spherical indehiscent fruits that greatly vary in shape and size, with a hard, woody thin shell, with a white slimy and astringic inner pulp that surrounds the small (8mm X 9mm) dark flatten seeds. In Cuba and the Dominican Republic, *Crescentias* seem to be found cultivated almost exclusively near places with human habitation, with very little wild populations spotted. They can be found in wet or dry coastal regions, with little know if they occur in mountainous areas.

-INSERT Picture 4 & 6-

One of my main priorities while visiting both islands was to identify local scientists that would be interested in collaborating with me on my project, that had valuable information about localities where I could find my plants of interest, and could help understand the particular research permits application process that I need to apply for in each island in order to start my next field research season. In my travels, I had the opportunity to many scientists that were excited and eager to collaborate with me in different aspects of my project. Whether it was accompanying me to field, aiding in collections, advising in places I could stay or eat, providing a space where I could work, or helping navigate the craziness of public transportation in Cuba and the Dominican Republic. To learn more about my plants of interest the distribution and potential uses of the plant, I visiting local herbariums and botanical gardens on each island. To learn more about my plants of interest traditional uses, I consulted scientific literature suggested by collaborators and I also visiting local “yerberos” and “botánicas”, which are public dispensaries of plant material for medicinal, edible, cultural, and religious purposes. After learning about the distribution and uses of this plant in Cuba, I was able to conduct a road trip across the island with one botanist collaborator and two assistants. We traveled most of the island searching for places where these plants are found, listening to local people's stories as to how they use them, and contemplating everywhere we went a great variability in fruit and leaf morphology, as well as the plant's architecture.

-INSERT Picture 5 & 7-

From my research, I was able to gather some of the traditional uses of the plants, were *Crescentia cujete* seems to be the dominant or most seek out of all species. Traditionally, a decoction of the fruit pulp can be taken orally to treat diarrhea, stomach pain, colds, bronchitis, cough, asthma, urethritis, abortion and to treat a woman's infertility. The leaves to treat hypertension properties. The flower can be used to treat ear infections. The bark of the tree has be used different wood crafts. The fruit shell has been documented for use as containers, scoops, cups, musical instruments, and religious tokens. Something that I found striking is that in *Crescentia cujete* their seems to have a lot of plasticity in regards to its fruits shape, size, and morphology. From interacting with local, each distinct fruit morph seem to be used for a different purpose and this makes me think further as to if their is some sort of selective pressure happening in regards to how humans are using these plants.

-INSERT Picture 3-

While island hopping for this project and enjoying the beautiful natural scenery each country had to offer, I was also able to find some spare for learning new and useful skills, such as making chocolate!

-INSERT Picture 8-