*Mitracarpus polycladus*

Population ecology

* **[Literature Review]** Update information about the historical and current range and distribution of *Mitracarpus polycladus*. Conduct a literature search on reports of the species presence, herbarium information, unpublish reports and interviews to people that has work with the species or related species. The information gathered and their sources will be compiled and saved in an electronic file to make it available to the agencies for its reference.
* **[Historic and Current Distribution in Puerto Rico (to update the species range)]** Visit the locations where the species has been reported in Puerto Rico to corroborate its presence. A GPS point of each confirmed location will be recorded to create a map that can shows the *M. polycladus* current range and distribution in Puerto Rico. The GPS points and maps with associated created shapefiles will be save in an electronic file to make it available to the agencies.
* **[Habitat Description and Availability]** Describe the habitat and the species composition (flora) associated to the site where *M. polycladus* is found. Using this information and the available landscape data, estimate the amount of suitable habitat available for *M. polycladus* within the species range. (For example: by 2017, *M. polycladus* occupy approximately 1.1 acres (0.44 ha) compared to the amount of habitat available (1,438 ac (582.3 ha) within its range in the Guánica Commonwealth Forest (DRN 1976).
* **[Spatial Distribution and Abundance]** Analyze available landscape data, and previous reports on species presence, to conduct a distribution and abundance study covering the area fitting the species habitat characteristics.
  + Establish random points on the selected area
  + At each point measures the distance to the nearest individual of the species
* **[Population Size and Population Trends]** Establish survey plots to evaluate abundance and density, species demographics (recruitment, growth, and mortality)
  + Using the information obtained on abundance and distribution, select 60 points that contain at least 3 adult individuals to establish monitoring plots (1 m2)
  + Identify, making a diagram (including the distance among each) and, if feasible, by tagging with numbered aluminum tags inserted in the ground next to the shrub, the individuals in each plot.
  + Collect data on stage (adult, seedling), growth (height and width), recruitment, and mortality at each plot. If seeds are observed, collect information on their location and condition.
  + Visit each plot during the spring, summer, fall and winter, to collect the above-mentioned data. Tag new seedlings to monitor their progress during each visit. Describe their location (open canopy, under canopy, …)
  + Measure environmental parameters (temperature, humidity, precipitation)

[**Reproductive biology and Phenology**]

* Within the established plots, describe reproductive structures and phenology of adult individuals. The plots will be visited during the spring, summer, fall and winter, to evaluate changes under different environmental parameters.
* Data on environmental parameters at the plots will be collected (temperature, precipitation, humidity, amount of sun exposure, wind exposure and speed).
* Monitor the branches to describe the phenology (number of inflorescences, number of open flowers per inflorescence, number of seed per infructescence).
* Collect data on flower presence and duration, pollinators (including behavior), seeds presence and dispersion, and germination.
* Study seed viability and germination to establish potential propagation methodology

[**Threats**]

* During each survey, evaluate the presence of potential threats such as habitat impact due to anthropogenic activity (human-induced fires, management activities, human trampling), predation, diseases, invasive species and species competition.
* Changes in microclimate conditions- Measure environmental parameters (temperature, humidity, sun and wind exposure) in locations (all or representation of the population) where the species is found to set a baseline (current conditions).