

## New England Botanical Club – Minutes of the 1019<sup>th</sup> Meeting 8 September 2006

Karen Lombard, Recording Secretary

The 792<sup>nd</sup> meeting of the New England Botanical Club, being the 1019<sup>th</sup> since its original organization, was held on Friday, September 8, 2006, in the seminar room of the Harvard University Herbaria, Divinity Avenue, Cambridge, MA. There were 33 members and guests in attendance. President Karen Searcy opened the meeting by welcoming guests, including members of the New England Society of Botanical Artists, and by announcing that the 2006-2007 program schedule is now available on the club website. She also stated that we had a successful June meeting at Camp Hi-Rock in the Berkshires.

Karen then introduced the evening's speaker, Dr. Lelia Orrell Elliston. Lelia recently completed her Ph.D. at the University of Massachusetts Boston and has just accepted a position with the Massachusetts Audubon Society as the Regional Director for Greater Boston and the North Shore. She spoke about her doctoral research on the "Natural History, Floral Morphology, and Population Biology of *Sabatia kennedyana*."

*Sabatia kennedyana*, the Plymouth gentian, is a semi-aquatic evergreen plant that occurs along the coastal plain from Nova Scotia to South Carolina. It reproduces both sexually and asexually, and is reported in the literature as both a biennial and perennial. The species is found primarily on glacial coastal plain ponds in Massachusetts, where it is rare due to fluctuations in population size that result from the dramatic annual changes in water levels occurring at these sites. Very little is known about the population biology of most of the plant species that occur on these ponds. Lelia's research focused on documenting basic information about natural history and population genetics of *S. kennedyana* using populations on 14 ponds in southeastern Massachusetts. These ponds ranged in size and degree of human impact, primarily in amount of water withdrawal and recreational use.

Flower morphology in *Sabatia kennedyana* is very diverse; Dr. Elliston documented 19 types of flower deviants, although the most common morph is pink. The majority of the morphs were site-specific, whereas a few were found at more than one site. Small populations had a greater flower diversity (statistically significant), but a larger sample size of small ponds needs to be examined to confirm this. Causes may be inbreeding, environmental stress, or transposon activity. [Transposons are sequences of DNA that can move around to different positions within the genome of a single cell, causing mutations. Transposons are also called "jumping genes" or "mobile genetic elements," and in flowers can cause a mottled or speckled effect in flower color and pattern.]

Lelia determined that Coleoptera were the most common pollinators of *Sabatia kennedyana*, though shining leaf chafers, honey bees, and banded longhorn beetles were all important pollinators. A comparison with a similar study conducted in Nova Scotia revealed that in Massachusetts, the species averages 2.7 flowers per plant and has 84% fruit set, while at the northern end of its range in Nova Scotia there are on average 2 flowers per plant and 71% fruit set.

In her genetic research, Lelia discovered high haplotype diversity and high migration rates (33.87) between ponds, however, more work needs to be done on other markers with greater population sampling, especially from a greater number of small populations. There was no relationship between diversity and population size or between genetic distance and geographic distance between ponds in Massachusetts. In order to address metapopulation dynamics, more research needs to be completed to examine genetic variation across the entire range of the species.

In her population research, Lelia established permanent plots and tracked individual plants over a six-year period. Through this work she was able to construct a population model for *Sabatia kennedyana*. She found Plymouth gentian to be a triennial or short-lived perennial with three stages: a small rosette stage or first-order juvenile (<7 cm), a large rosette stage or second-order juvenile (>7 cm), and flowering adults. Individuals may also stay within the rosette stages and not flower. In rare cases plants would flower late in the season of their second year, but these flowers were short-stalked with zero seed set. Lelia measured the diameters of non-flowering rosettes in three populations that were subject to different human impacts. One pond, which was adjacent to a working farm, averaged significantly larger rosettes than other ponds, most likely due to fertilizer runoff.

Hydrology has a large impact on *Sabatia kennedyana*, as populations at the ponds studied fluctuated dramatically in response to water level changes during the six years of Lelia's research. The greatest growth and lowest mortality occurred in summer when pond shores were dry, and mortality increased as summer water levels increased. The seed bank is important to population recovery and persistence, and more research needs to be done on just how long the seed bank for this species can persist.

Lelia concluded her talk with some comments on conservation of *Sabatia kennedyana*. She mentioned that the species should be protected from off-road vehicle impacts and from collecting (in the past, this species was heavily collected due to its attractive flower). Water levels should also be managed to allow for some summers where there is dry pond shore available for reproduction. Migration rates between ponds (via pollen and seeds) are high enough and seed banks substantial enough that there is likely no need for re-introductions, and small populations of the species are not necessarily genetically at risk. To learn more about her work, you can visit <http://www.elliston.org/family/lelia/sabatiapublic/index.html>.