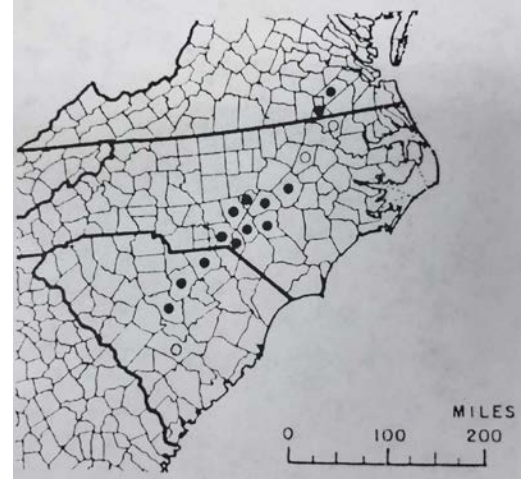


Sandhills to Sequencing: Collecting Leaf Tissue from a Rare Plant for DNA Analysis

By Carol Ann McCormick, Curator, University of North Carolina Chapel Hill Herbarium

In 2002, Herbarium associate Bruce Sorrie and Mark Skinner of the United States Department of Agriculture described a new species of lily from the southeastern United States. *Lilium pyrophilum*, “Sandhills Lily,” is a large, charismatic wildflower “known from 16 counties in the Carolinas and adjacent Virginia [occurring] within the longleaf pine ecosystem in sandy, wet to dry ecotonal situations such as streamheads, seeps, swampy streams, and wet, maintained powerlines.”¹ The specific epithet “pyrophilum,” meaning “fire loving” in Latin, was chosen because frequent fires are essential to maintain the proper habitat for this lily.

Brian R. Keener of the University of West Alabama is studying taxonomically ambiguous populations of *Lilium* in the coastal plain of Alabama and Mississippi. He is conducting a molecular study of these plants, so he is gathering leaf tissue from various lily species across the southeast. The leaf tissue is ground to powder then treated with various chemicals to extract and precipitate the DNA. This past summer Keener requested fresh leaf tissue from Sandhills Lily so he could compare its DNA to the “ambiguous” mystery lily and to Turks Cap Lily (*Lilium superbum*).



Lilium pyrophilum range. Solid circles represent counties with extant populations documented since 1990, open circles show counties where the species is historical (pre-1990) and presumed extirpated.¹



Bruce Sorrie collecting leaf tissue from *Lilium pyrophilum*. Photograph by Jimmy Randolph of the Sandhills Natural History Society, August 2017.

In August 2017 Bruce Sorrie led members of the Sandhills Natural History Society on a field trip to see *Lilium pyrophilum* in bloom, and he took the opportunity to collect leaf tissue for Keener’s studies. Sorrie placed a single leaf in a small envelope containing silica gel which both desiccates the plant tissue so that the plant’s enzymes do not degrade the DNA and prevents fungi from overwhelming the leaf tissue. The packet containing the leaf tissue was mailed to Keener, and we look forward to seeing his study published.

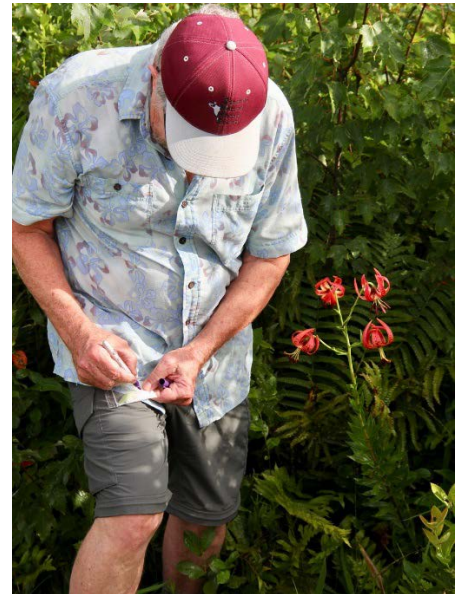
Scientists can also use herbarium specimens for isolating plant DNA. In general, the older the plant specimen, the more challenging it is to isolate usable DNA. Paul Gabrielson, Herbarium associate and adjunct professor in the UNC-Chapel Hill biology department, has isolated and sequenced DNA from algae collected in 1791! (See [“Voyages of Discovery: novel information from old herbarium specimens”](#) from the November 2010 issue of the NCBG newsletter.)

I plan to ask Bruce Sorrie and the Citizen Scientists of the Sandhills Natural History Society to collect seed from *Lilium pyrophilum* so that this rare plant can be grown in the Sandhills Habitat at the North Carolina Botanical Garden.

The Sandhills Natural History Society meets monthly at Weymouth Woods Sandhills Nature Preserve in Southern Pines. All are welcome to their meetings and field trips.



Citizen Scientists of the Sandhills Natural History Society on a field trip with Bruce Sorrie. Photograph by Jimmy Randolph, August 2017.



Bruce Sorrie writing information on envelope containing silica gel and leaf tissue. Photograph by Jimmy Randolph of the Sandhills Natural History Society, August 2017.

Reference:

1. Skinner, Mark W. and Bruce A. Sorrie. 2002. Conservation and ecology of *Lilium pyrophilum*, a new species of Liliaceae from the sandhills region of the Carolinas and Virginia, U.S.A. *Novon* 12: 94-105.