The Campaign for the Living Collections takes explorers to many diverse parts of the temperate world in search of target taxa. Specific knowledge of plant ecology and plant communities helps us determine where we can find these taxa, and therefore where we will travel. From October 12–19, 2017, the multi-institutional Coastal Southeast Expedition (COSE) brought us to the coastal plains of South and North Carolina. Traveling through national forests, private lands, and public parks, we saw many habitat types, including calcareous forests, maritime depressions, pocosins (wetland bogs), Carolina Bays, longleaf pine savannas, pond cypress swamps, and ecotones (transitional regions between these habitats). In covering several hundred miles of Atlantic coastal plain between these two states, we targeted and collected taxa successfully by understanding and interpreting the plant community associations inherent in these various habitat types.

The classic paradigm of plant collecting involves gathering historical locations of desired
taxa, while leveraging local knowledge through floristic experts in the targeted collection areas. During COSE, we saw the importance of plant collectors combining these classic ideologies with the knowledge of ecological fundamentals such as floral associates, environmental factors, and lifecycle needs to identify and locate our target taxa.

Our trip began in a calcareous, or limestone, bluff forest in the Francis Marion National Forest in South Carolina, where we collected *Acer barbatum* (southern sugar maple). By seeking out this rare forest type in South Carolina, which is unique in its exposed rock outcroppings and high-calcium soils, we found the home of several species that are otherwise rare in this region. We collected seedlings of *A. barbatum*, and found *Sabal minor* (dwarf palmetto), *Ulmus rubra* (slippery elm), *Juglans nigra* (black walnut), and various ferns. Just down the bluff was Wadboo Creek, a tributary of the Cooper River. In this wooded swamp, we expected to find plants that would thrive in a similar soil type, but with much more available water, such as *Cornus foemina* (swamp dogwood) and *Ampelaster caroliniana* (climbing aster), the latter of which was climbing other shrubs and trees on both sides of the creek. We were just in time to enjoy its yellow-centered lavender flowers.

We then traveled to the Sewee Shell Ring in Francis Marion, where an interpretive trail leads to a 4,000-year-old shell ring and an 800-year-old clamshell mound. These shell mound sites, called middens, were created by Native Americans discarding clam and oyster shells that have since broken down into soil that favors the growth of certain plant species. By seeking out a sandy shell-influenced soil type at a maritime forest edge, we found *Opuntia humifusa* (eastern prickly pear) and *Tilia americana var. caroliniana* (carolina basswood). Just inland from these collections we found true maritime forest, with heavier soils and accordingly an abundance of stately *Quercus virginiana* (southern live oak) draped in *Tillandsia usneoides* (Spanish moss), with wonderful twisted trunks overhanging salt marsh flats.

Another habitat we encountered was the longleaf pine savanna. Once covering more than 60 million acres in the American southeast, these habitats, dominated by *Pinus palustris* (longleaf pine), have shrunk to less than 3 million acres due to overharvesting and deforestation. Despite the overwhelming dominance of *P. palustris*, these ecosystems are actually among the most diverse in North America, with plant diversity levels in the understory among the highest outside of the tropics (Outcalt and Sheffield, 1996). Many of the herbaceous species found in these habitats depend on conditions created by the presence and dominance of *P. palustris*, or on frequent fires. Without fires inhibiting woody plant expansion, the understory would not be nearly as diverse.

We first sought out this ecosystem type in South Carolina, and collected *Pinus palustris* cones in conservation lands at Brookgreen Gardens, led by their natural lands manager Mike Ammons. This pine savanna had dry, sandy soils, which don’t occur frequently in the coastal plain, and we expected to find *P. palustris* trees in all stages of growth, given its tolerance to fire and need for sandy, well-draining soils.
In North Carolina, we encountered longleaf pine savannas in the Croatan National Forest. Botanists Andy Walker and Gary Kauffman introduced us to this habitat and pointed out rare plant species, such as federally endangered *Lysimachia asperulifolia* (roughleaf yellow loosestrife). These savannas were wetter than those we visited in South Carolina, and thus had more species tolerant of wet conditions. In small, wet depressions, for example, we found several *Sarracenia* (pitcher plant) species as well as *Dionaea muscipula* (Venus fly trap). In addition to these carnivorous plants, we collected *Persea palustris* (swamp bay), *Gordonia lasianthus* (loblolly bay), and *Zenobia pulverulenta* (dusty zenobia). We learned from Andy and Gary how quickly these plants re-establish after fire: within two seasons, burned areas become nearly impassable to humans due in part to regenerative shrub growth, as well as the vining *Smilax laurifolia* (laurel greenbrier).

Familiarity with the ecosystems of our target species is valuable not only for finding and collecting them, but also for considering the next phases of life for our propagules. While the Arnold Arboretum landscape does not feature the same conditions that we encountered in the Carolinas, we can attempt to replicate some of their characteristics when siting the COSE collections as Arnold Arboretum accessions. Luckily, with each germplasm collection, we took copious notes describing the plant and the environment where we found it—this documentation is just as important as the germplasm itself. To give our collections the best chance to thrive in Boston, we can consider these data with other criteria pertaining to the Arboretum landscape, such as topography, soil conditions, water status, and even how the original species associates perform here.

**Literature cited**


Sean Halloran is the Plant Propagator and Jenna Zukswert was a Living Collections Fellow (2016–2017) at the Arnold Arboretum.