

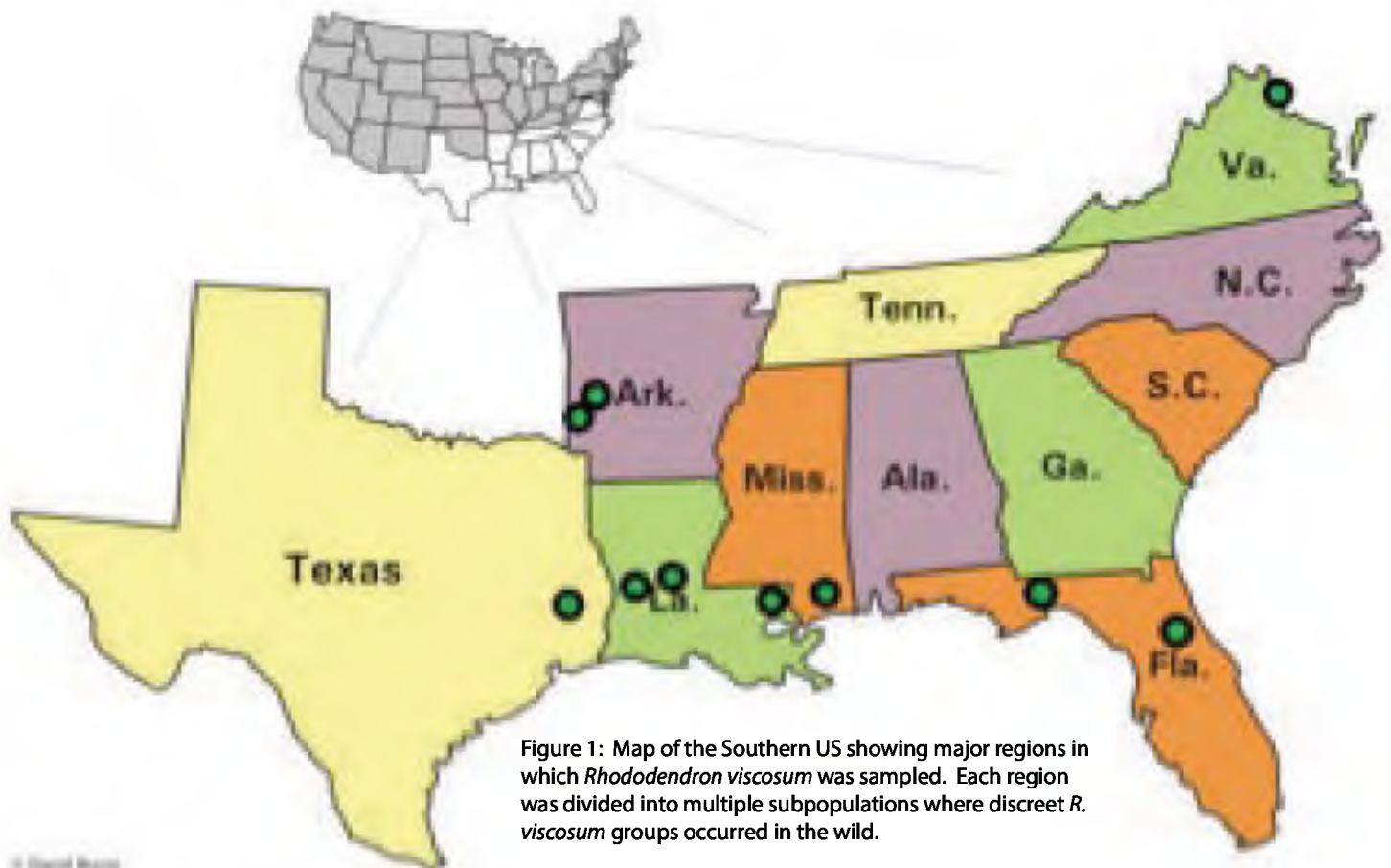
# A Road Map Towards High pH Adaptability: Phenomic and Genomic Approaches to Azalea Breeding (*Rhododendron sp.*)

Alexander Susko, St. Paul, Minnesota

*From Hale Booth, Chair, Azalea Research Foundation Committee:*

*In the fall of 2013, the ASA Azalea Research Committee funded a \$2,000 research grant to Alexander Susko, a graduate student at the University of Minnesota, to help underwrite his research into genome-wide association mapping of *Rhododendron viscosum*, a widely dispersed native azalea. Your ASA research committee thought this project was particularly important because the results may produce important research for future development of azaleas that are more tolerant of alkaline soils, thus potentially opening up new geographic areas for growing and enjoying azaleas. The research project will span more than one year and is not complete, but Mr. Susko has provided the following interim report on the progress to date.*

A research grant from the Azalea Society of America has enabled me, Alex Susko, and my advisors (listed in my bio below) to collect and begin evaluating diverse *Rhododendron viscosum* germplasm to identify genetic and phenotypic variations for pH adaptability. During the Spring of 2014, I developed novel, in vitro screening methods for *Rhododendron* to test seedlings at a young age for their ability to withstand higher calcium carbonate concentrations at elevated pH. I then searched for *Rhododendron viscosum* populations through historical herbarium records and a



two-month collection expedition from Arkansas to Florida in national forests between May and July of 2014. Populations were chosen to be a part of the study based on their isolation from human activity and occurrence in representative environments for each region along the Gulf Coast. Cuttings successfully rooted from each population are now housed at the University of Minnesota Landscape Arboretum's Horticultural Research Center. Seed retrieved from wild populations in late October 2014 is currently undergoing germination testing. Seed from wild, half-sibling families will be grown and phenotyped in the spring for pH tolerance incorporating genetic relatedness into a model to determine the relative performance of each wild population for our candidate traits. We also hope to determine the genetic effect on pH adaptability in deciduous azaleas to inform future breeding efforts in these and other woody species, while evaluating for other horticultural qualities important to Minnesota growers.



Figure 2: *R. viscosum* maternal parent tagged for future seed collection and genotyping. Near Boles, Arkansas, on the Fourche la Pave River. Ouachita National Forest.

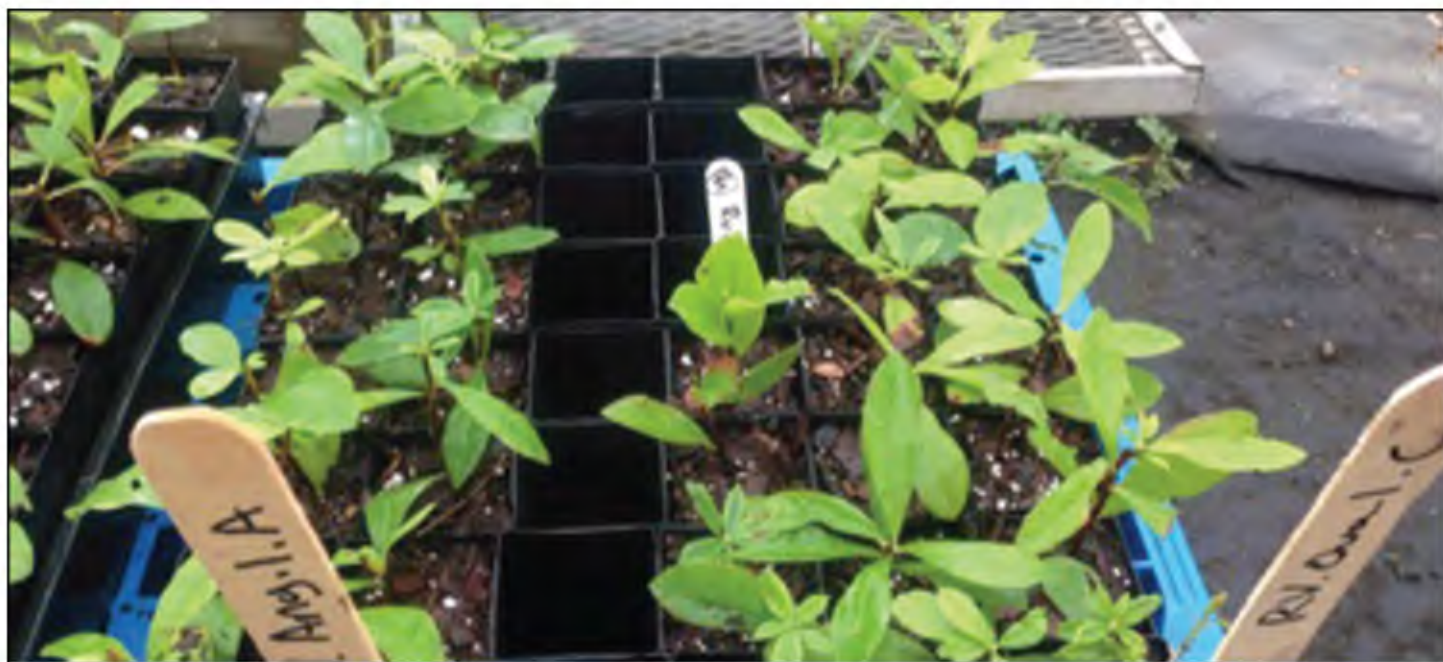


Figure 3: *R viscosum* rooted cuttings from wild populations at the Horticultural Research Center in Excelsior, Minnesota. This material will serve as parents and sources for new cuttings in future breeding efforts.

*Alex Susko is a master's degree student studying plant breeding and molecular genetics at the University of Minnesota Twin-Cities and advised by Stan Hokanson (professor of Woody Plant Breeding and Genetics), Jim Bradeen (professor and head, Department of Plant Pathology), and Tim Rinehart (Research Plant Molecular Geneticist, USDA-ARS in Poplarville, Mississippi. Susko has been interested in woody plants throughout his academic career, and looks forward to continued research within the genus Rhododendron as he begins his doctoral research in the near future.*