

**P111 • Laary Cushman<sup>1</sup>, Patrick McMillan<sup>1</sup>, Kathy Mathews<sup>2</sup>**Incipient Speciation in *Hydatoca* Necker

In 2002 a unique population of *Hydatoca* Necker was discovered in the upper Piedmont of Pickens County, SC growing on a low-elevation granite dome. The plants appeared to be very similar to the widespread *Hydatoca petiolaris* but display an annual life form and flower during the late winter and early spring. A study was initiated to determine if the population in Pickens County meets the criteria of the biological, phylogenetic and ecological species concepts and thus constitutes a novel species. We utilized dried plant collections and measurements taken from living specimens to assess the morphological distinctions. Internal Transcribed Spacer (ITS) sequence analysis of tissue samples from both high-elevation *H. petiolaris* and plants from the low-elevation populations was performed to assess phylogenetic species criteria and the ecological conditions on each of the sites is being monitored and recorded using Hobo Monitors to determine variations between the populations. Controlled garden experiments are being conducted to determine if the flowering time and life form is merely a response that is possible among the widespread high-elevation populations. Floral morphology, stature and life-form prove distinct. Due to range and flowering time these populations are biologically segregated and thus meet the biological species criteria. Previous ITS sequencing of the Pickens Co. study plot showed a distinct and separate lineage when compared to high elevation plots. Low elevation isolation has led to morphological, biological, and phenotypic variation in this population that could represent a novel or incipient species.

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**P112 • Penny A. Carroll Ashley B. Morris**Phylogeographic Analysis of the American Beech (*Fagus grandifolia*)

The purpose of this research is to take a multi-faceted approach to testing biogeographic hypotheses in the American beech (*Fagus grandifolia*; Fagaceae). Previous work using chloroplast sequence data was unable to provide sufficient resolution to address questions of intraspecific taxonomy and evolutionary history. Our approach will involve sampling hundreds of individuals from multiple populations distributed from Nova Scotia to Mexico. Samples will be genotyped using nuclear and chloroplast microsatellite loci, and also with chloroplast DNA sequences. Fossil calibration of phylogenetic hypotheses will be used to estimate intraspecific divergence times. Species distribution models will be used to hindcast paleodistributions and to forecast future distributions under scenarios of climate change. The American beech faces many pressures, including forest degradation, land development, and the spread of beech bark disease. By using an interdisciplinary approach, we hope to clarify a number of ecological and evolutionary questions that have practical applications for forest management strategies.

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**P113 • Jessica M. Bartek, Amy M. Vardeman, Richard Carter**

## Digitization of the Valdosta State University Herbarium: Undergraduate Student Perspectives

The Valdosta State University [VSU] Herbarium is an actively growing collection of more than 65,000 vascular plant and bryophyte specimens. An NSF-funded project to digitize the VSU Herbarium is currently nearing completion. Digitization and associated collections improvement tasks at the VSU Herbarium have been accomplished largely through the efforts of undergraduate student assistants. Basic aspects of workflow and output for specimen mounting, data entry, imaging, and related activities will be presented from the perspective of the student assistants. An important broader impact of this digitization project is to instill knowledge and encourage appreciation of the importance of plants to society and the value of biological research collections, as well as to teach basic soft skills

that will benefit students beyond their baccalaureate experience. The student assistants will describe how their hands-on involvement with this project will enhance their careers and their lives.

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**P114 • Thomas G. Ludwig, Melanie A. Link-Perez**

Distinguishing *Adiantopsis alata* From *A. radiata* Through Isolation and Amplification of Genomic DNA

*Adiantopsis* Fée is a small genus (30-40 species) of ferns in the cheilanthoid clade of the Pteridaceae. One species in this genus is known as *Adiantopsis alata*. It was described in the late 1880's by Karl Anton Eugen Prantl but has generally been subsumed into *A. radiata* since many workers regarded the two species as identical. *Adiantopsis radiata* is the most widespread species in the genus and has many morphological similarities to *A. alata*. An in-depth morphological study conducted by the Link-Pérez lab suggests that *A. alata* is actually a distinct species. The objective of this project was to collect molecular data to clarify the taxonomic identity and phylogenetic placement of *A. alata*. Total genomic DNA was isolated from six samples of *A. alata* and the plastid genes *rbcL* and *atpA* were amplified. The DNA sequences were compared to those of the rest of the clade to determine *A. alata*'s relationship to *A. radiata* and the other species within the genus. Phylogenetic analysis has confirmed that *A. alata* is molecularly distinct from *A. radiata*. Furthermore, *A. alata* is less closely related to *A. radiata* than some other members of the genus.

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**P115 • Timothy J. Cole, Elizabeth G. Dobbins**

Effects of Surface Runoff From a Landfill Containing Coal Ash on Water Chemistry in Adjacent Surface Water in Perry County, Alabama

Coal ash is a combustion residue that is a major byproduct of coal-powered electricity generation. Coal ash often contains contaminants including arsenic, boron, chromium, and sulfide. In 2008, Perry County's Arrowhead landfill became the recipient of 2.3 million m<sup>3</sup> of coal ash removed from the Emory and Clinch Rivers after a rupture of TVA Kingston Fossil Plant's coal ash containment site. This landfill is adjacent to several residences and the upstream of small tributaries that run through fields of cattle and into local creeks. We surveyed surface water around the landfill in the summer of 2013 and January 2014 to determine if the water quality was affected by the landfill. The conductivity, total dissolved solids, and arsenic concentration of the water directly running off and adjacent to the landfill were significantly higher than a control stream that does not interact with the landfill ( $P < 0.01$ ). Arsenic levels were higher than EPA drinking water, but not surface water, guidelines. Concentrations of other indicators of coal ash such as boron, chromium, and sulfide were not significantly different from the control. This preliminary evidence indicates that the landfill has an effect on the water quality in tributaries of Chilatchee Creek.

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**P116 • Donna Saylor, William Ensign**

Growth Rate of Tipulidae on *Ligustrum sinense* And *Liriodendron tulipifera*

*Ligustrum sinense* (Chinese Privet) becomes more common in stream riparian zones as urbanization increases. As native deciduous species are replaced and privet takes over, the proportion of privet in the leaf litter increases, changing the food source of invertebrate shredders in the stream. The main purpose of this study was to determine if invertebrates in the family Tipulidae, a main shredder of leaf litter, will utilize *L. sinense* as a food source. We hypothesize that tipulids will prefer a diet of native *Liriodendron tulipifera* (Tulip Poplar) over a diet of *L. sinense*. To test this hypothesis, we compared the relative growth rates of tipulids on diets of *L. sinense* and *L. tulipifera*. Our prediction was that the growth rate of tipulids on *L. sinense* would be less than the growth rate of tipulids on *L. tulipifera*. Tipulids were maintained in laboratory mesocosms for six weeks and fed an ad