



## Life as a Block Herbarium Fellow During the COVID-19 Pandemic



Life in the Herbarium certainly changed as a result of the pandemic, but we have been able to enjoy lots of our normal programming thanks to the safety precautions Sewanee has taken to reduce the spread of COVID-19. For context, my name is Sidnee C. Everhart, and I am a senior biology and English double major. I have been involved with the Sewanee Herbarium since my junior year, meaning COVID-19 has been part of almost half of my fellowship. I would like to share with you some of the exciting projects I undertook as a Herbarium fellow during the COVID-19 pandemic and how COVID-19 both did and did not make itself present in herbarium life.

I had the pleasure of taking Dr. Jon Evans' Conservation Biology course this past semester and conducted my own research while assisting other students through my role as a Herbarium fellow. My two class research projects focused on the impacts of the Endangered Species Act on Michaux's sumac (*Rhus michauxii*) and a 10-year follow-up investigation of Japanese spiraea's (*Spiraea japonica*) invasion of creek habitat off Breakfield Road near the University Equestrian Center.

Through my support role as a Block Herbarium Fellow, I assisted a group studying vernal pools with Geographic Information System (GIS)-related questions. The group was able to map disturbance regimes within one and five kilometers transcribed about Sewanee's vernal pools using ArcGIS Pro software. Their findings illustrated how most vernal pools in Sewanee are impacted by disturbance, especially near central campus. Disturbances within one and five kilometers of vernal pools are significant because they can disrupt salamanders that live within the vicinity of their ancestral pools. Salamanders, including the iconic spotted salamander (*Ambystoma maculatum*), can be crushed or fail to find forage in disturbed habitats, though their ranges are restricted because of their reliance on

their ancestral vernal pool for breeding. Also, the overall quality of the pools is significant because the salamanders lay their eggs in the pools. The group's findings speak to the long-term efforts of the Sewanee Biology Department to conserve local vernal pools and the flora and fauna that call them home. COVID-19 played a role in the vernal pool project because of social distancing around computer terminals and the occasional issue of understanding each other through masks. Despite these relatively minor inconveniences, student research support remains central to the Herbarium's place in the Sewanee community.

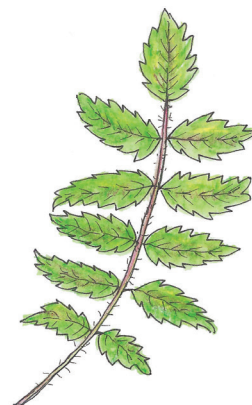
While the vernal pool group tackled their project, my team of two followed up on an initial assessment of Japanese spiraea's invasion of the creek adjacent to the University Equestrian Center off Breakfield Road, which was begun some 10 years ago. Japanese spiraea is known to track basic soils. The limestone gravel from Breakfield Road has created basic runoff while the upland forest soils native to the area are quite acidic. Therefore, Japanese spiraea has been able to invade Sewanee's forests near limestone roads, such as near the Equestrian Center. The basic soils are less suitable for most native species one would expect to find in these habitats. Japanese spiraea's invasion into the forest is unusual. Most invasive plant species in Sewanee rely on the mechanical disturbance regimes and high-light habitats found along our roadways.

We hoped to discover whether spiraea posed a threat of further penetrance into the forest and we concluded that further research would be necessary. Though we found fewer one-stemmed spiraea plants, more two- and three-stemmed individuals were present. These larger individuals are more sexually mature, increasing the number of seeds available for invasion. There are also some signs of spiraea occupying acidic soils near the basic soils around the creek receiving runoff from Breakfield Road. Further investigation may confirm spiraea's ability to penetrate into acidic forest soils beyond its already recognized invasive properties. My project was relatively unimpacted by COVID-19. My partner and I were often working 20 or 30 feet apart in the isolation of the forest. It was reassuring that we could continue our usual research, though we were masked and socially distanced.

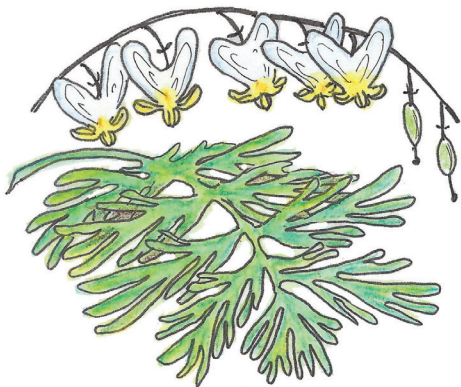
For my second project in conservation biology, I researched the impacts of the Endangered Species Act on Michaux's sumac. I took an interest in it because it is the only federally endangered plant species in my home, Davie County, North Carolina. The plant bears the name of André Michaux, a famous botanist responsible for discovering and classifying many American taxa. Michaux's sumac is relatively small, capping out at around one meter tall. It produces white blooms in the spring and sports densely pubescent, "fuzzy," stems and leaves. The leaves have unique serrations that, in addition to other features, make the plant an optical spectacle for plant enthusiasts who find it in the woodlands of Virginia, the Carolinas, Georgia, and Florida. Michaux's sumac is naturally rare because it clones itself from its root stock, producing single-sex populations that often become isolated. It will breed with some success if plants of both sexes are present. In addition to that requirement, conservation efforts generally include the reintroduction of the disturbance regimes relied upon by Michaux's sumac for sun. The plant thrives in woodlands that have historically featured more open canopies, light penetrance, and more frequent patch fires than forests.

Michaux's sumac migrates into poor habitat along roadways because of the light found there. Conveniently, state departments of transportation seem keen on digging up the endangered populations and taking them to conserved woodlands like the William B. Umstead State Park where staff can cut away canopies or perform

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# Dutchman's Breeches—a Favorite Spring Ephemeral



As we enter the spring wildflower season, many, though not all, of those we so enjoy seeing in our deciduous woods are in a group known as “spring ephemerals.” True spring ephemerals emerge early in the season, flower and set fruit in a short period of time, and then allow flowers and leaves to fade, retreating to their underground structures until next spring. This strategy allows them to take advantage of the light and warmth reaching the forest floor before the canopy closes and avoid competition for pollinators. Their high rate of photosynthesis allows for this rapid growth and reproduction as well as the accumulation of reserves for the following year. These reserves are stored in underground rhizomes, bulbs, corms, and tubers. In this group is Dutchman's breeches, an especial favorite.

The common name comes, of course, from the shape of the flower, which has been compared to that sort of nether garment. Pictures of the “Little Dutch Boy” with his finger in the dike from *Hans Brinker and the Silver Skates* give one an idea of the voluminous nature of those breeches. This common name has persisted, even though in Victorian times it was considered to be rude or offensive to refer to that part of the body and garments clothing it, and alternative names were strongly urged. There is a great variety of other though less popular common names, such as white hearts, soldier's cap, eardrops, and butterfly banners.

The flowers appear to be hanging upside-down along the stalk. Two of the four petals are white and have spurs at the base (the breeches) and two have a yellow portion that projects over the stamens. They are similar in shape to those of the familiar garden flower, bleeding heart, which is in the same genus, as well as squirrel corn, which is very similar, except that the lower “lips” are pink rather than yellow. The leaves are low to the ground and are finely divided, bluish-green with a whitish cast to them. When seen without the flowers, they are sometimes mistaken for ferns by the casual observer. The flowers' nectar can only be reached by female bumblebees, with their eight-millimeter-long tongues. However, holes may sometimes be seen at the tips of the spurs, where other insects have made a shortcut to the nectar and in the process incidentally avoiding pollinating the flower.

The scientific name of Dutchman's breeches is *Dicentra cucullaria*, meaning two-spurred and hooded. Other species in this small genus occur in North America and in Asia, but not elsewhere in the world. Formerly classified in the family Fumariaceae, it is now a member of the poppy family. Indeed, *Dicentra* contains chemicals which are somewhat toxic and narcotic. It is called staggerweed by cattle farmers due to its effect on cattle who eat it, sometimes even causing death. Not surprisingly, there are few traditional medicinal uses of this plant.

Shakerag Hollow is a prime site for this spring wildflower. According to local history, Jean and Harry Yeatman spotted just one patch of it around 1950 near the big rock about 500 yards below Green's View. Now, decades later, it is rather widespread along various sections of the trail. It prefers rocky, limestone regions and soil rich in woodland humus.

—Yolande Gottfried



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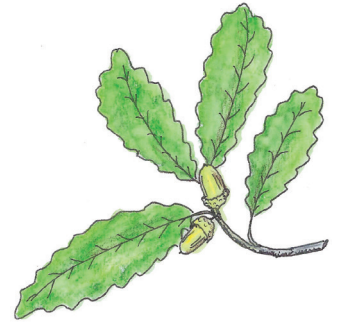
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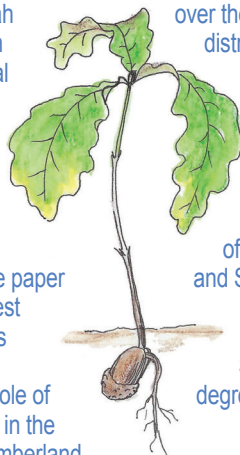


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## Research on Chestnut Oak Published

Callie Oldfield, C'14 (biology); Sarah Oldfield, C'18 (mathematics); and Jon Evans published a paper in the journal *Forest Ecology and Management* on the population dynamics of chestnut oak (*Quercus montana*). This several-year study is the first to examine the long-term effects of sprouting in a population of oaks across all life history stages. The paper presents data from a one-hectare forest plot on the Domain that Evans and his students have studied continuously since 1995. The paper contrasts the role of sprouting and seedling establishment in the persistence of this species on the Cumberland Plateau and projects the future of the population



over the next 50 years using a size-class distribution matrix model parameterized from the long-term demography data. Both Callie and Sarah worked on this project as undergraduates and continued the collaboration with Evans in graduate school. Callie is a Ph.D. student in the Department of Botany at the University of Georgia, and Sarah is a master's student in the Department of Mathematics at the University of Arkansas. Both Callie and Sarah expect to receive their graduate degrees in 2021.

—Jon Evans

### THE SEWANEE PLANT PRESS

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Illustrations by Mary Priestley.

## "Safe & Sound" Trails & Trilliums Festival

The Herbarium won't be offering guided hikes this spring, but staffers will be involved with the Friends of South Cumberland State Park's 17th Annual Trails & Trilliums Festival, an outdoors-only event on April 9–11, with masks and social distancing mandated. So grab your mask and your hiking stick and come enjoy the beauty of South Cumberland in spring. The event will again be held on the grounds of the DuBose Conference Center in Monteagle, using the large open-air pavilion for presentations. In place of guided hikes, we will offer an array of hike options with trail greeters at each trailhead to provide information about the hikes and answer questions. The native plant sale will take place as usual. Registration is scheduled to open on March 1 on [www.trailsandtrilliums.org](http://www.trailsandtrilliums.org).



—Margaret Matens

### HERBARIUM PUBLICATIONS

*Fiery Gizzard: Voices from the Wilderness*

*What If Trees Could Walk?*

*Trail Guide to Shakerag Hollow*

*Sewanee Wildflowers in Watercolor*

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*Dreaming about Spring*

## Block Herbarium Fellow, continued from page 1

controlled burns. The future looks good for this species because of the cooperation between conservation groups, transportation departments, and fruitful years of research surrounding it. The abundance of websites and web catalogs for scientific journals meant research on Michaux's sumac went just as well during COVID-19 as it would have in pandemic-free times.

The Sewanee Herbarium, in addition to its more public role, also supports its fellows' research. I have undertaken my senior research project under the tutelage of Dr. Evans in the hopes of achieving honors in biology, a publication, and a deeper connection to Sewanee's scientific interests. I am studying Appalachian hill cane (*Arundinaria appalachiana*), which is one of the three bamboo, or cane, species native to the Southeast. The genus *Arundinaria* is also native to Southeast Asia, it is what China's pandas eat loads of every day. All *Arundinaria* species are clonal, often forming very large patches across the landscape. *Arundinaria* clones flower after a disturbance or after a certain number of years, depending on the species. Pandas are naturally rare because entire bamboo forests die off every few decades when they flower, leaving the pandas far from food. Hill

cane is unique because it has never been known to flower throughout its range in the Southern Appalachians. In my project I seek to locate all of the hill cane stems in areas off Breakfield Road and in Franklin State Forest and construct a GIS database documenting its distribution in relation to fine-scale topography within the landscape. By understanding hill cane's habitat, we may be better able to discover and preserve this unusual species.

My project serves Dr. Evans' and Dr. Ashley Morris', C'97 (Furman professor of biology), longer-term investigations of hill cane's genetics, distribution, evolutionary history, and appropriate conservation. Zoom meetings with Dr. Evans and Dr. Morris have been essential during COVID-19 and have actually been helpful in engaging with this project. I had to acquire a rare permission from the University to research in Franklin State Forest because it is outside the Sewanee bubble. Thankfully, Dr. Evans and I were able to collect data safely because there were no other visitors in our vicinity. So, while COVID-19 did make getting permission for my research more difficult, it has proceeded more or less normally and safely because of the University's commitment to best practices and the abundant research opportunities on the Domain. I look forward to completing

my research in my last semester and hope that students can remain on campus until May.

The Sewanee Herbarium looks forward to another semester of supporting student research, access to plant conservation resources, and defeating COVID-19. Though we miss gathering for hikes or films, we know that our efforts to stay physically distant speak to our commitment to unity, safety, and science. The Domain, even when isolated from Tennessee's surrounding wonders, continues to offer students excellent botanical opportunities. The Herbarium remains open for questions and plant-related talk, though we will not be having large formal events. Yes, COVID-19 continues to alter the normal programming at the Herbarium, but it has not stopped us from demonstrating the multitude of amazing things plants have to offer in Sewanee.

— Sidnee C. Everhart, C'21

