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Book Review

Book Review: *Wildflowers of the Midwest* by Don Kurz

Reviewed by Eric Fuselier, ANPS President

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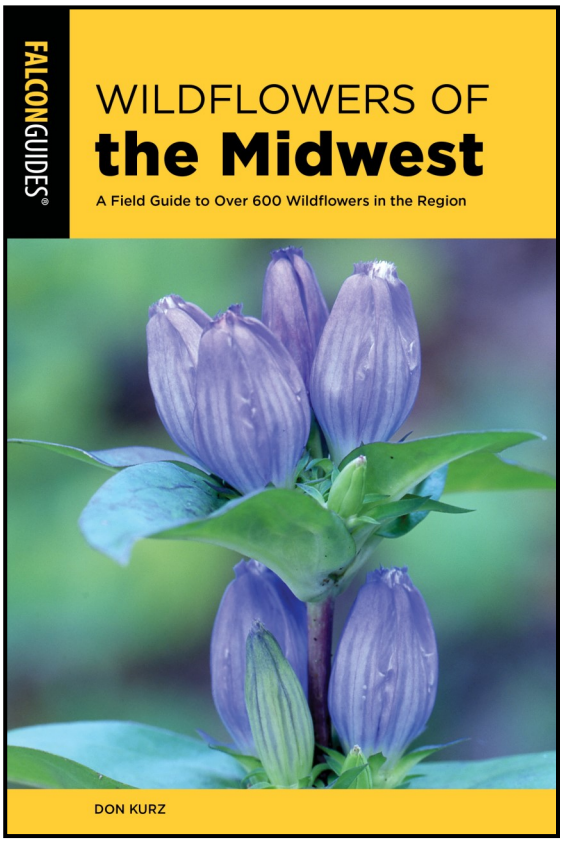

While I haven't had the opportunity meet Don Kurz in person, he has long felt like a regular companion of mine, joining me on many of the countless jaunts and saunters that I took into the wilderness throughout my 20's and 30's. In fact, I credit much of the familiarity I gained in my younger years with the wildflowers found growing in Arkansas to Don. So, you can probably imagine how excited I was for the opportunity to review his latest field guide, *Wildflowers of the Midwest* published by Falcon Guides.

A considerably thicker field guide than his previous works, it sits on the table in front of me as I write this, impossible to ignore as it beckons me to take it back out into the woods to "field-test" it one last time before I complete this review. Just shy of 400 pages and densely packed with plant profiles covering over 600 species, each one photographed by Don Kurz himself, this guide could easily replace several others currently sitting on my shelf.

Wildflowers of the Midwest begins with a brief description of the natural communities found throughout the Midwest region of North America, followed by a brief introduction to plant morphology to familiarize the user with some of the terminology used to identify species in the field. A glossary can also be found in the back in case the reader comes across any unfamiliar terms as they pour over the pages within this text.

Like Don's other field guides, the species are grouped into sections based on the dominant color of their inflorescence, which makes for easy use in the field by both amateur naturalists and professional botanists alike. With a few exceptions, each color section is then further arranged by plant family and then by genus, with the species within each genus listed alphabetically. This general style of organization simplifies the process of determining the species of a particular plant specimen while in the field after you've been able to first narrow it down to its family or genus. Each plant profile describes the

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physical characteristics of that species, its habitat and range, as well as any ethnobotanical uses the species is known for.

The last section in the book is labeled "Weeds" and covers many of the non-native and invasive species we often have to contend with. Knowing how to identify these undesirable species is just as important as learning to identify the native species, since it is so often these noxious and invasive species that threaten our natives either by outcompeting them or by shading them out. Once we become familiar with a particular invasive species, we can begin to remove the plants from our gardens, yards, and properties, to the benefit of both the native species and the wildlife which depends upon them.

Since the geographic range covered by this guide is much more broad than many of Don's previous works, the bloom period for each species had to be described in more general terms, using seasons rather than months as temporal units of measurement in order to accommodate readers in northern Minnesota as well as those in Arkansas and Tennessee.

Also due to the broad geographical range, not all of the species covered in this book can be found here in Arkansas, as our state is located at the southern edge of the range covered by this field guide, as shown on the map in the first few pages. To be exact, only the northern part of our state is shown to be included on this range map, but that's not to say that you can't still find many of the species covered here throughout the rest of our state as well.

I recommend *Wildflowers of the Midwest* to anyone who wishes to familiarize themselves not only with many of the herbaceous species found in Arkansas, but with many of the species that exist outside of our state as well, especially those who find themselves traveling throughout the Midwest, whether that be for business or for pleasure. *Wildflowers of the Midwest* is a useful guide indeed, and one that should be included on the shelf of both the casual traveler and the serious botanist, and anyone else who may find themselves trekking through this botanically rich region.

Members Remembered

Charlotte Faye Littrell, age 78, of Smithville, passed from this life April 30, 2021, in Fort Smith, Arkansas. She was born on January 7, 1943 to Hugo Oscar Schenk and Ruby Evelyn Lochridge, in New Orleans, Louisiana.

Charlotte was a long-time resident of Smithville, OK. She was a retired schoolteacher having spent her teaching career, first, as a Physical Education teacher and then as a Science teacher in New Orleans, LA. It was there she met and married fellow teacher Harold Littrell. After retirement they moved permanently to Smithville.

Char (as many called her), was a lady of many interests. First, she was a "Nawlins" girl; So naturally she followed the Saints every fall. She was an avid bowler. She loved doing crafts and scores of people received her hand made gifts of cards, pins, decorations, and knickknacks. Her front porch was decorated for every holiday and visible to all who drove by; Halloween seemed to be her favorite. She did Continuing Ed classes at local community colleges for years. Char was a Red Hatter, and proud of it! She was a minister to any she perceived in need. Many people can attest to her kindness and concern expressed in her own, unique Charlotte Style. She was a member of Octavia Baptist Church and more importantly she was a follower of Jesus. Charlotte left her mark in this community and she will be remembered and missed.

Mary Alice Beer died on October 2, 2021. She had been a member of ANPS and was an avid native plant gardener long before it was popular. She also collected hundreds of plant specimens in the early 90s, many of which are preserved at the UARK Herbarium. Mary Alice hosted ANPS at Fairfield Bay/Greers Ferry for the Fall 2004 Meeting and led walks to some nice glades and other sites in the area, including "The Beer Run", a hiking trail she maintained that wound through her gardens and onto other parts of her property.

Stay tuned for details on the ANPS 2022 Spring Meeting to be held in Northwest Arkansas!

Members Remembered

Carl Ray Slaughter, M.D., who practiced Obstetrics/Gynecology in the Kansas City, Missouri, north area for twenty-three years, lived with his wife, Jannene Gerardi Slaughter, in Marshall, Missouri.

Carl was born on January 29, 1933, in Little Rock, Arkansas to Florence Elizabeth Slaughter and Wilbur Logan Slaughter, M.D. His father was a physician at that time in the Civilian Conservation Corps in Arkansas. In early childhood he lived in Boonville, Arkansas, Clarksville, Arkansas, Opilaka, Alabama, Columbus, Georgia and Fort Benning, Georgia, where his father was a physician in the Army in World War II. His father later was in the European theatre with General George Patten's third Army. At this time, Carl went to Jonestown, Mississippi to live with his paternal grandparents. After his father was discharged from the Army his family of six: mother, father and four sons moved to Little Rock, Arkansas.

Carl started playing tackle football at nine years of age at Fort Benning and continued through his own military career. He also participated in basketball and track. In five years of football, he had seven knee injuries. In his three years of high school at Little Rock Central High, his school won the Arkansas State Championship in football three times. The newspapers were commenting on the lack of competitiveness of their Arkansas opponents. So, in Carl's senior year on high school, they played top ranked teams from Texas, Oklahoma, Kentucky and Alabama. One of the two Oklahoma games was at the "snake pit" (the University of Oklahoma stadium) in front of the legendary Oklahoma coach, bud Wilkinson. He made the statement that Little Rock Central High School was the best coached high school football team he had ever seen. The team and members were voted into the Arkansas Football Hall of Fame.

In high school at Little Rock Central High, Carl was a member of several school organizations, President of the Interclub Council, Parliamentarian of the National Honor Society, Key Club and many others. He was a delegate to the Arkansas Boys State where he was elected State Land Commissioner. Carl was voted the "Most Polite" in the class of 1951.

He joined the Arkansas Air National Guard while in high school in order to acquire a free automobile license plate. His guard unit was activated during the Korean War. He spent his military time in the pacific Northwest of the United States at McCord Air Force Base where he was the NCOIC of the medical lab with the rank of Staff Sergeant. While there, he was a member of the base's judo team and its football team.

He was honorably discharged from the Airforce and the Arkansas Air National Guard at the same time and returned to Little Rock, Arkansas to a pre-med education at Little Rock, Jr. College and Hendrix College. He represented Hendrix on the school's volleyball team and received the award for the Best Intramural Athlete. Carl was voted the 3rd most intelligent student while at Hendrix.

Carl married Barbara Jewell Viar of Little Rock, Arkansas in 1955 and entered the University of Arkansas Medical School that year. During medical school he was involved with medical research and wrote several papers that were printed in the appropriate medical journals, receiving a third-place award for one of them.

During Carl's medical school, internship and fellowship years, Barbara and Carl had two sons, Mark Carl Slaughter and Stanley Logan Slaughter. Carl's internship was in Tulsa, Oklahoma and his fellowship was at Ellis Fischel State Cancer Hospital in Columbia, Missouri.

Carl's residency was at Kansas University Medical University Medical Center in Kansas City, Missouri and later he was a clinical instructor in Obstetrics and Gynecology at the medical school. While at the University he authored and published five other medical papers.

He practiced his specialty of Obstetrics and Gynecology for twenty years in Kansas City North area, first alone and then adding five other physicians. He was an officer in the Clay County Medical Society, President of the Kansas City Gynecological Society, Western delegate to the Missouri Gynecological Society and the Missouri delegate of the Gynecological Society to Washington, D.C.

He retired in 1987 and he and Barbara moved to Petit Jean Mountain, Arkansas. He became interested in photographing wildflowers and authored a book on the Wild Orchids of Arkansas. He was elected President of the Arkansas Native Plant Society. During these early years of retirement, Barbara and Carl enjoyed extensive foreign travel, eventually traveling to all seven continents of the world including both the Artic and Antarctica. After several wonderful retirement years together, Carl's wife, Barbara died.

Carl and Jannene were married abroad the Queen Elizabeth II on August 25, 1993. They traveled both in and outside of the United States for many years. They initially lived on Petit Jean Mountain overlooking the Arkansas River. This is where Jannene and Carl both lived with their respective spouses prior to their spouse's deaths. In 2009, they returned to the Kansas City area. They moved into Jannene's home in Independence, Missouri. This home was on a beautiful bluff overlooking the Missouri River. This location called the Wayne City Bluff, was described in the mid 1800's and published in history books as the "most beautiful location in America."

In recent years, Carl and Jannene relocated to Marshall, Missouri. They were very happy in their home and the small town feel of Marshall.

Kingfisher Trail Walk with ANPS November 3, 2007

Time Capsule article written by Eric Sundell

Kingfisher Trail at Pinnacle Mountain State Park is a flat, paved, half mile loop along the Little Maumelle River through an impressive bottomland forest dominated by grand old trees. Janice and Bill Craig and George and Lillie Sinclair came down from Marshall for the walk. Bill and Devon Holimon and Mick Terry from Little Rock, Paula Furlough from Monticello, and Paula's daughter-in-law Julie Frank from Little Rock also joined Milanne and me. We had a beautiful day for the walk, cool, crisp, and clear. We set a park record for speed: at more than three hours, we were the slowest group to ever complete the Kingfisher Trail without stopping to barbecue.

Fall color was coming on and wildflowers were few—the last perfect heads of yellow ironweed were still blooming—so we spent most of the time admiring the woody plants and added five species to a preliminary list of 56 trees, shrubs, and woody vines. Large trees in deep woods display a lot of trunk at eye level, while their canopy leaves may be more than 50 feet in the air; this meant that it was harder than usual to overlook bark in all its variations of color and texture. The oaks, for instance—the big ones from 1-3 ft in diameter, or about 5-10 ft in girth—displayed distinctive bark murals: white oaks with soft, pale gray bark becoming shaggy higher on the trunk; cherrybark oaks with dark, rugged, but unridged bark; and Shumard and water oaks both with surprisingly smooth bark even on the largest trees. White elms in the deep woods had developed a bark pattern of thin scales that flake away like jigsaw puzzle pieces. (They were a particularly welcome sight for Milanne and me after our August trip to Vermont where all the larger elms are gone.) Sugarberries wore tightly stretched gray bark heavily ornamented with corky warts, so diagnostic that my dendrology students relied on bark rather than leaves for identification. Familiar trees, like box elder and silver maple, were so large that at first they were difficult to recognize, in part because the mature bark was so unfamiliar. Sycamores towered above us, and that's where we had to look for the white, smooth, shining inner bark characteristic of the entire genus—on most trees, the older stems do develop a more standard dark, flaky outer bark that doesn't exfoliate. The most deceptive trees were the river birches—everybody knows river birches, right?—but here they were so big that the standard, light, peeling bark was only to be seen up in the sky on the finer branches. Large river birches can reach heights of 60-80 ft and trunk diameters of 2-3 ft, and these trunks were at least 12-18 inches. Such giants are not the domesticated trees of malls and dooryards.

What else? Black walnuts were scattered on the slightly higher, well drained parts of the river terrace, and when Mick Terry spotted a pecan, easily mistaken for black walnut, we were able to demonstrate the celebrated *Juglans* pith test! Slicing the twigs lengthwise down the middle, the gorgeous chambered pith of the walnut was readily distinguished from the solid pith of pecan. And there were paw paws, with foot long leaves, just putting on their glorious yellow fall color, many of the trees 25-30 ft or more in height, and their crushed leaves still pungent with the smell of green peppers—another of those dendrology student identification aids. (At the spring meeting in April, the leafless paw paws were just coming into bloom.) And then there was the redbud: one tree struggling for light in the dense canopy was estimated to be at least 60-70 ft. Crown spread and trunk diameter were ordinary, but a few of us swore that it was twice the height of any redbud we had ever seen.

The climax of the trip, about halfway round the loop, were the massive, magnificent bald-cypress trees on the river bank. Theo Witsell informed me that the trees have been cored and, with some extrapolation (apparently several were soft in the middle), appear to be 500-600 years old. One hollow tree was large enough to swallow Janice Craig whole. Bald-cypress is closely related to the California giants, the redwoods and sequoias, and before the felling of the forest primeval, commonly grew their trunks to 3-5 ft in diameter, with the biggest trees—prodigies of 1000-1700 years—with trunks 10-15 ft thick! William Bartram visiting an Indian village in Florida in the late 1700's, described their bald-cypress canoes in his *Travels*: "These Indians have large handsome canoes which they form out of the trunks of Cypress trees (Cupressus disticha), some of them commodious enough to accommodate twenty or thirty warriors. In these large canoes they descend the river on trading and hunting expeditions to the sea coast…quite to the point of Florida, and sometimes cross the gulph, extending their navigations to the Bahama Islands and even to Cuba…"

It was a beautiful day for a walk in woods dressed to the nines in fall color. (Maybe you have to be an ex dendrology prof or a fashionista, but I thought the bark stole the show.)

Arkansas Native Plants for Phytoremediation

Part I: Using Native Plants to Improve Stormwater Quality in Urban and Suburban Landscapes, *By Eric Fuselier*

Native plants have been getting a lot of well-deserved attention in recent years. As the public has become increasingly aware of troubling population declines in pollinator and wildlife species, due in part to habitat loss, we are starting to see native plants used more and more in gardening and landscaping practices.

This is, of course, great news and encouraging to see. But for all the buzz around native plants, there is another benefit many of these species can provide that I believe has been thus far mostly overlooked.

Phytotechnology and Phytoremediation

Phytotechnology is an emerging field that makes use of the naturally existing properties of plants in order to accomplish defined outcomes in a designed environment. One such application of phytotechnology is contaminant removal, otherwise known as phytoremediation. The benefits of using this approach include providing habitat for wildlife while being more sustainable, costing less, and providing better aesthetics than traditional methods of environmental remediation.

Phytoremediation makes use of the natural ability of certain plant species to accumulate, sequester, or breakdown contaminants found in the environment. Much research has been devoted to testing the suitability of certain plant species for remediating specific contaminants, with many of the species looked at in these studies being native to one region or another. This approach to environmental remediation is more often applied on large scales (for instance, for the remediation of contaminated soil at brownfield sites). However, the concepts and body of knowledge regarding phytoremediation using native species also can be applied, on much smaller scales, to the mutual benefit of both the ecosystem and society.

In this article, we will focus on the use of phytotechnology to address a serious problem that most cities, municipalities, and land managers face: polluted stormwater. Because impervious surfaces such as roads, parking lots, and buildings occupy a significant portion of the urban and suburban landscape, they prevent the soil from absorbing stormwater. Instead, most of this stormwater flows laterally across these surfaces, transporting any contaminants it picks up along the way into the nearest storm drain. From there the contaminated water flows directly into a local stream or water body. Any contaminants that do not make it into the body of water typically are absorbed by soil near the contaminant's source.

Let's consider how we can implement phytotechnology using native plant species to improve stormwater runoff before it enters these habitats, as well as some of the common contaminants which may affect the health of soil and aquatic habitats.

How it Works

There are five main phytotechnological mechanisms that we can make use of when trying to improve stormwater quality:

Phytodegradation makes use of the ability of certain plant species to take up the contaminants through their roots and break them down internally through the plants' metabolic processes. Through phytodegradation, contaminants are degraded, incorporated into the plant tissues, and used by the plants as nutrients. Fast-growing species may take up and store contaminants faster and in larger amounts than species with more average growth rates. Nitrogen-fixing pioneer species are also currently being studied due to their fast growth rate, high biomass, and hardiness.

Phytostimulation is the process by which contaminants are broken down in the soil by microbial activity that is enhanced by the compounds exuded from the roots of a plant. Many of the microorganisms in soil, such as yeast, fungi, and bacteria, can utilize harmful organic substances as their nutrient sources, and in the process degrade them into harmless substances. Natural exudates from plant roots, such as sugars, alcohols, and carbon-containing acids, provide food for these soil microorganisms and enhance their metabolic activity. In addition, the loosening of soil by plant roots and water availability in the root zone also aids the phytostimulation process. While it is a slower process than phytodegradation, phytostimulation is very effective.

Phytoextraction refers to the absorption and uptake by plants of large amounts of inorganic contaminants such as heavy metals and mineral nutrients from the environment, and to the translocation of these contaminants into the aboveground parts of these plants. With this technique, consider using woody species that produce high biomass and are classified as hyper-accumulators of these contaminants. If hyper-accumulator species are not available or not ideal to use at a site, then species known to accumulate a targeted contaminant in lesser quantities, but that still produce high biomass, can also be effective for phytoextraction.

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Phytostabilization is the use of certain plant species to immobilize contaminants found in soil and groundwater through various mechanisms, including absorption and accumulation of the contaminant by the roots of these plants, adsorption of the contaminant onto the surface of the plants' roots, or through the precipitation of the contaminant within the root zone of the plants. This latter mechanism makes use of certain chemicals exuded by the roots of these species which can immobilize or precipitate the targeted contaminant. Moreover, the transport proteins associated with the root zone of certain species are able to irreversibly bind and stabilize some contaminants. Alternatively, these contaminants can be taken up by the roots and thus become sequestered by the root system. It should be noted that this technique does not remove the contaminants from the site, but effectively immobilizes or stabilizes them, making them unavailable for entry into the food chain.

Phytohydraulics refers to the ability of certain plant species to capture, transport, and transpire water from the environment. With this technique, plants can be used to draw contaminated groundwater toward their roots in order to change the speed or direction of groundwater flow, or to modify groundwater levels at a site. Species with high evapotranspiration rates are best used for this purpose, however such species are often not drought tolerant, so irrigation may be needed depending on site conditions. It is important to note that this mechanism does not degrade the targeted contaminants, but can be combined with other mechanisms such as phytodegradation or phytostimulation to serve this purpose.

Phytoremediation is best suited for sites with low to moderate levels of contamination, where the level of toxicity is not high enough to inhibit plant growth. Potential applications of these phytotechnological mechanisms to improve stormwater quality include their use in rain gardens, bioswales, detention ponds, and other stormwater control structures strategically located to accept runoff from parking lots, roadways, dry cleaners, autobody shops, industrial and manufacturing sites, and other sites where contaminants commonly occur in the runoff. Specific contaminants are discussed below, along with the native plant species that can be used to remediate or control them using the phytotechnological mechanisms discussed above.

Sediment and Turbidity

Turbidity, which is the measure of the amount of suspended sediment in water, can negatively impact aquatic ecosystems by restricting the depth to which sunlight is able to reach. Without sunlight, algae in the water are unable to perform photosynthesis, a process which aquatic organisms such as fish and macroinvertebrates depend upon to provide them with the dissolved oxygen in the water which they need to breathe. High turbidity levels can also lead to soil particles becoming lodged in fish gills, which can restrict their ability to breathe and cause suffocation.

A common source of sediment causing high turbidity levels in our waterways is erosion originating from construction sites, agricultural fields, logging activities, and eroding streambanks. Phytotechnology can offer an effective way to remove this sediment from stormwater before it enters the local waterways.

To effectively contain on-site sediment, we can select fast growing species that produce dense foliage and a high quantity of biomass. The density of the foliage and high biomass helps to slow down and filter stormwater as it enters a body of water, facilitating the deposition of any sediment it may contain. Below is a list of native plant species that meet these criteria which can be combined with other Best Management Practices for erosion control to contain on-site sediment more effectively.

TABLE 1: NATIVE SPECIES FOR SEDIMENT CONTROL

Scientific Name	Common Name
Andropogon gerardii	Big Bluestem
Bouteloua curtipendula	Side Oats Grama
Bouteloua gracilis	Blue Grama
Elymus canadensis	Canada Wild Rye
Panicum virgatum	Switchgrass
Schizachyrium scoparium	Little bluestem
Sorghastrum nutans	Indiangrass

Including these species within the riparian buffers along the banks of streams and rivers, along the edges of lakes and ponds, and downslope or adjacent to construction sites and logging activities are additional measures companies can take to reduce turbidity levels in local waterways, and prevent the adverse impacts that turbid stormwater runoff can have on sensitive aquatic ecosystems.

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Nutrient Pollution

While aquatic habitats require nutrients to support the organisms that live in them, excessive levels of nutrients lead to eutrophication, a process that creates harmful algal blooms that can result in fish kills and other damage to aquatic ecosystems. Common sources of excess nutrients in our local waters include fertilizers applied to lawns, fields, and agricultural lands, dead or freshly cut vegetation entering streams and water bodies, and even sediment originating from sources listed above in the previous section of this article.

Woody species with high growth rates are excellent for reducing the amount of nutrient pollution that enters waterways. Phreatophytes, which are deep-rooted trees and shrubs that obtain a significant portion of the water they need from the water table, meet these criteria and can be very useful for this purpose. Often found growing in arid locations or in areas with standing or running water, phreatophytes typically have fast growth rates, and can thus take up a lot of nutrients in a short amount of time as they incorporate these nutrients into their biomass. Utilizing these special qualities for both phytohydraulics and phytoextraction can help remove nutrients from stormwater before they enter local waterways. See below for a list of phreatophytes native to Arkansas.

TABLE 2: NATIVE PHREATOPHYTES FOR NUTRIENT POLLUTION

Scientific Name	Common Name
Acer negundo	Box Elder
Acer rubrum	Red Maple
Magnolia virginiana	Sweetbay Magnolia
Populus deltoids	Eastern Cottonwood
Quercus alba	White Oak
Salix caroliniana	Coastal Plain Willow
Salix eriocephala	Missouri Willow
Salix humilis	Prairie Willow
Salix interior	Sandbar Willow
Salix nigra	Black Willow
Sambucus nigra	Elderberry
Taxodium distichum	Bald-cypress

Additionally, herbaceous species that have both high growth rates and produce high biomass can also be effective for reducing the amount of nutrients entering our waterways. Below is a list of native herbaceous species that possess these qualities. Including these species and/or phreatophytes in stormwater detention structures, such as rain gardens, bioswales, and detention basins, will allow for additional uptake of nutrients, preventing them from entering local bodies of water.

TABLE 3: NATIVE HERBACEOUS SPECIES FOR NUTRIENT POLLUTION

Scientific Name	Common Name
Andropogon gerardii	Big Bluestem
Panicum virgatum	Switchgrass
Schizachyrium scoparium	Little Bluestem
Sorghastrum nutans	Indiangrass
Spartina pectinata	Prairie Cordgrass
Vicia americana	American Vetch

The species listed in Tables 2 and 3 can also be planted in other types of sites to reduce the amount of nutrients that are entering aquatic ecosystems and to prevent eutrophication of downstream water bodies. These locations include riparian buffers along the banks of streams and rivers, the edges of lakes and ponds, and in vegetative filter strips, constructed wetlands, and other stormwater control infrastructure receiving runoff from sources containing excess nutrients.

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Petroleum

Most petroleum products have a density less than water, and thus tend to float and spread into a thin layer on the water surface (called a *sheen*). Once in the water they can be harmful to wildlife and have adverse impacts to aquatic ecosystems.

Sources of petroleum in stormwater can include fuel spills from engine maintenance and repair activities, petroleum extraction activities, and leaks from above- and underground storage tanks. Other sources are engines dripping motor oil, grease, gasoline, and diesel fuel onto the surfaces of parking lots, driveways, roadways, and railyards.

Some categories of petroleum are easy to degrade. These include gasoline and diesel fuel; methyl tert-butyl ether; benzene, toluene, ethylbenzene, and xylene; and other aliphatic hydrocarbons. Phytotechnological mechanisms useful for remediating these categories of petroleum include phytostimulation and phytodegradation.

Other categories of petroleum, such as polycyclic aromatic hydrocarbons, coal tar, crude oil, and heating oil are much more difficult to degrade. Because of this, phytostimulation is the only useful phytotechnological mechanism for remediating soil and water contaminated with these categories of petroleum.

Below is a list of species shown through research to have the ability to remediate soil contaminated with the petroleum categories listed for each one. Including

TABLE 4: NATIVE SPECIES FOR PETROLEUM POLLUTION

TREES & SHRUBS

Scientific Name	Common Name	Contaminant Targeted*
Celtis occidentalis	Hackberry	BTEX, TPH, PAH
Cercis canadensis	Redbud	PAH
Fraxinus pennsylvanica	Green Ash	PAH
Gleditsia triacanthos	Honey Locust	BTEX
Juniperus virginiana	Eastern Red-cedar	BTEX
Morus rubra	Red Mulberry	PAH
Pinus echinata	Shortleaf Pine	MTBE, TBA
Populus deltoides	Eastern Cottonwood	Aniline, Phenol, m-Xylene, PAH, BTEX, MTBE, DRO, TPH
Quercus macrocarpa	Bur Oak	BTEX
Quercus phellos	Willow Oak	Dioxin
Robinia pseudoacacia	Black Locust	PAH, MOH
Salix caroliniana	Coastal Plain Willow	DRO, TPH, BTEX, PAH
Salix eriocephala	Missouri Willow	DRO, TPH, BTEX, PAH
Salix humilis	Prairie Willow	DRO, TPH, BTEX, PAH
Salix interior	Sandbar Willow	DRO, TPH, BTEX, PAH
Salix nigra	Black Willow	DRO, TPH, BTEX, PAH

GRASSES, RUSHES AND SEDGES

Scientific Name	Common Name	Contaminant Targeted*
Andropogon gerardii	Big Bluestem	PAH
Bouteloua curtipendula	Side Oats Grama	TPH, PAH
Bouteloua gracilis	Blue Grama	PAH
Carex cephalophora	Ovalhead Sedge	PAH
Carex stricta	Upright Sedge	TPH
Elymus canadensis	Canada Wild Rye	TPH, PAH
Elymus hystrix	Bottlebrush Grass	PAH
Juncus effusus	Common Rush	PAH
Panicum virgatum	Switchgrass	Anthracene, PAH (total priority), Pyrene, TPH,
Schizachyrium scoparium	Little Bluestem	PAH
Scirpus atrovirens	Green Bulrush	PAH, Phenol, BOD, COD, Oil and gasoline, TSS
Scirpus cyperinus	Woolgrass	Phenol, BOD, COD, Oil and gasoline, TSS

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Scirpus georgianus	Georgia Bulrush	Phenol, BOD, COD, Oil and gasoline, Phenol, TSS
Scirpus pendulus	Nodding Bulrush	Phenol, BOD, COD, Oil and gasoline, TSS
Sorghastrum nutans	Indiangrass	TPH, PAH
Spartina pectinata	Prairie Cordgrass	PAH
Tripsacum dactyloides	Eastern Gamagrass	TPH, PAH
Typha domingensis	Southern Cattail	DRO, Oil and gasoline, Phenol, TSS, BOD, COD
Typha latifolia	Broadleaf Cattail	DRO, Oil and gasoline, Phenol, TSS, BOD, COD
FORBS & WILDFLOWERS		
Scientific Name	**Common Name**	**Contaminant Targeted***
Helianthus annuus	Common Sunflower	PAH
Sagittaria latifolia	Arrowhead	TPH
Senna obtusifolia	Coffee Weed	PAH
Solidago altissima	Tall Goldenrod	TPH, PAH
Solidago arguta	Forest Goldenrod	TPH, PAH
Solidago caesia	Blue-stemmed Goldenrod	TPH, PAH
Solidago flexicaulis	Zigzag Goldenrod	TPH, PAH
Solidago gigantea	Giant Goldenrod	TPH, PAH
Solidago hispida	Hairy Goldenrod	TPH, PAH
Solidago missouriensis	Missouri Goldenrod	TPH, PAH
Solidago nemoralis	Gray Goldenrod	TPH, PAH
Solidago odora	Sweet Goldenrod	TPH, PAH
Solidago petiolaris	Downy Ragged Goldenrod	TPH, PAH
Solidago radula	Western Rough Goldenrod	TPH, PAH
Solidago rigida	Stiff Goldenrod	TPH, PAH
Solidago rugosa	Rough Goldenrod	TPH, PAH
Solidago speciosa	Showy Goldenrod	TPH, PAH
Solidago ulmifolia	Elm-leaved Goldenrod	TPH, PAH

these species in rain gardens, bioswales, vegetative filter strips, riparian buffers, and constructed wetlands in locations receiving stormwater that may contain petroleum could help reduce the damage to aquatic ecosystems.

*Acronyms: BOD, biological oxygen demand; BTEX, benzene, toluene, ethylbenzene and xylene; COD, chemical oxygen demand; DRO, diesel range organics; MOH, mineral oil hydrocarbons; MTBE, methyl tert-butyl ether; PAH, polycyclic aromatic hydrocarbon; TBA, tert-butyl alcohol; TPH, total petroleum hydrocarbon; TSS, total suspended solids.

Pesticides

Pesticides can enter aquatic ecosystems through stormwater runoff from lawns, fields, agricultural lands, roadsides, rail corridors, and utility corridors. Once in the aquatic environment, pesticides can cause direct harm to fish and aquatic invertebrates, as well as reduce the availability of aquatic plants and insects that serve as habitat or food for fish and other aquatic organisms.

Below is a list of species that have been shown through research to have the ability to remediate soil and water contaminated with specific pesticides, using various phytotechnological mechanisms such as phytodegradation, phytoextraction, phytostimulation, and phytostabilization.

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TABLE 5: NATIVE SPECIES FOR PESTICIDE POLLUTION

Scientific Name	Common Name	Vegetation Type	Pesticide Targeted
Andropogon gerardii	Big Bluestem	Grass	Atrazine, Chlorpyrifos, Chlorothalonii, Pendimethalin, Propiconazole
Betula nigra	River Birch	Tree	Bentozon
Ceratophyllum demersum	Coontail	Aquatic	Metolachor
Elodea canadensis	Pondweed	Aquatic	Atrazine, Copper sulfate, Dimethormorph, Flazasulfron
Juncus effusus	Common Rush	Rush	Anthracene
Lemna minor	Common Duckweed	Aquatic	Demeton-8-methyl, Copper sulfate, Dimethomorph, Flazasulfron, Glyphosate, Isoproturon, Malathion, Metolachlor
Morus rubra	Red Mulberry	Tree	Anthracene
Panicum virgatum	Switchgrass	Grass	Atrazine, Pendimethalin
Populus deltoides	Eastern Cottonwood	Tree	Alachlor, Atrazine, Chlorpyrifos, Dinoseb, Dioxane, Metolachlor, Metribuzin
Salix nigra	Black Willow	Tree	Bentazone
Sorghastrum nutans	Indiangrass	Grass	Altrazine, Pendimethalin
Tripsacum dactyloides	Eastern Gamagrass	Grass	Anthracene, Chlorpyrifos, Chlorothalonil, Pendimethalin, Propiconazole
Typha domingensis	Southern Cattail	Grass	Atrazine
Typha latifolia	Broadleaf Cattail	Grass	Atrazine

Useful locations for these species include rain gardens, bioswales, vegetative filter strips, and constructed wetlands, as well as edges of streams, rivers, lakes, and other waterbodies that receive stormwater runoff from parks, orchards, fields, transportation and utility corridors, and residential areas where these pesticides are being used.

Conclusion

It is my belief that native plants are currently not being utilized to their fullest potential when selected for native gardens or landscapes. The list of species and contaminants covered in this article is by no means exhaustive. Other potential contaminants that could be targeted using phytotechnology include chlorinated solvents originating from current or historical dry-cleaning operations; air pollutants originating from roadways, interstates, and airports; and heavy metals originating from agricultural activities, industrial sites, and from mining and smelting operations. By utilizing the growing body of research available regarding the phytotechnological use of native plant species, such species can be strategically selected and placed on the landscape to either degrade or extract a variety of contaminants found in the soil, water, and air.

I believe native plants have immense potential in the field of phytotechnology. So I encourage anyone with an interest in landscaping, native plant gardening, or the health of aquatic environments to consider how surrounding land uses may be impacting the environment by contaminating stormwater. With the help of native plants, pollutants and contaminants can be removed or degraded and environmental quality improved.

In time, my hope is that native plant gardeners and landscapers, as well as professionals responsible for managing stormwater, will become just as knowledgeable about the native plant species useful for remediating specific contaminants as they are about species beneficial for particular pollinators. By applying these additional functions of native plants to the landscape in a thoughtful manner, we can work not only to improve the plight of pollinators, but to improve the environment as a whole.

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References

Albright III, V., and Coats, J. 2014. Disposition of atrazine metabolites following uptake and degradation of atrazine in Switchgrass. *International Journal of Phytoremediation* 16 (1), pp. 62-72, DOI, 10.1080/15226514.2012.759528.

Aprill, W., and Sims, R. C. 1990. Evaluation of the use of prairie grasses for stimulating polycyclic aromatic hydrocarbon treatment in soils.

Chemosphere 20, pp. 253-265.

Barac T., Weyens, N., Oeyen, L., Taghavi, S., van der Lelie, D., Dubin, D., Spliet, M., and Vangronsveld, J. 2009. Field note: hydraulic containment of a BTEX plume using poplar trees. *International Journal of Phytoremediation* 15 (9), pp. 877-888.

Burken, J. G., and Schnoor, J. L. 1997b. Uptake and metabolism of atrazine by poplar trees. *Environmental Science and Technology* 31 pp. 1399-1406.

Burken, J. G., and Schnoor, J. L. 1997b. Uptake and fate of organic contaminants by hybrid poplar trees. In *Proceedings, 213th ACS National Meeting, American Chemical Society Environmental Division Symposia, San Francisco*, pp. 302-304 (Paper #106).

Cook, R., et al. 2010. Field note: successful establishment of a phytoremediation system at a petroleum hydrocarbon contaminated shallow aquifer: trends, trials, and tribulations. *International Journal of Phytoremediation* 12 (7), pp. 716-732.

Cook, R., and Hesterberg, D. 2013. Comparison of trees and grasses for rhizoremediation of petroleum hydrocarbons. *International Journal of Phytoremediation* 15 (9), pp. 844-860.

Euliss, K., Ho, C., Schwab, A. P., Rock, S., and Banks, A. K. 2008. Greenhouse and field assessment of phytoremediation for petroleum contaminants in a riparian zone. *Bioresource Technology* 68, p. 989.

Ferro, A. M., Adham, T., Berra, B., and Tsao, D. 2013. Performance of deep-rooted phreatophytic trees at a site containing total petroleum hydrocarbons. *International Journal of Phytoremediation* 15 (3), pp. 232-244.

Henderson, K. L. D., Belden, J. B., Zhao, S., and Coats, J. R. 2006. Phytoremediation of pesticide wastes in soil. Zeitschrift für Naturforschung Section C – a *Journal of Biosciences* 61 (3-4), pp. 213-221.

ITRC (Interstate Technology & Regulatory Councl). 2009. PHYTO-3 Phytotechnology Technical and Regulatory Guidance and Decision Trees, Revised. Washington, DC: Interstate Technology & Regulatory Council, Phytotechnologies Team, http://www.itrcweb.org

Kennen, K., and Kirkwood, N. 2015. Phyto: Principles and Resources for Site Remediation and Landscape Design. Hoboken: Taylor and Francis.

Lee, K. Y., and Doty, S. L. 2012. Phytoremediation of chrlopyrifos by populus and salix. *International Journal of Phytoremediation* 14 (1), pp. 48-61.

McCutcheon, S. C., and Schnoor, J. L. 2004. Phytoremediation: Transformation and Control of Contaminants (Volume 121 of Environmental Science and Technology: A Wiley-Interscience Series of Texts and Monographs). John Wiley & Sons.

Qiu, W., Leland, T. W., Shah, S. I., Sorenson, D. L., and Kendall, E. W. 1997. Field study: Grass remediation for clay contaminated with polycyclic aromatic hydrocarbons. In Kruger, E. L., Anderson, T. A., and Coats, J. R. (Eds.). *Phytoremediation of Soil and Water Contaminants*, Washington, DC: American Chemical Society, pp. 189-199.

Reilley, K., Banks, M. K., and Schwab, A. P. 1993. Dissipation of polycyclic aromatic hydrocarbons in the rhizosphere. Journal of Environmental Quality 25, pp. 212-219.

Schwab, A. P., and Banks, M. K. 1994. Biologically mediated dissipation of polyaromatic hydrocarbons in the root zone. In T. A. Anderson and J. R. Coats (Eds.). Bioremediation through Rhizosphere Technology. ACS Symposium Series 563. Washington, DC: American Chemical Society.

Smith, K. E., Putnam, R. A., Phaneuf, C., Lanza G. R., Dhankher, O. P., and Clark, J. M. 2008. Selection of plants for optimization of vegetative filter strips treating runoff from turfgrass. *Journal of Environmental Quality* 37 (5), pp. 1855-1861.

Wilste, C. C., Rooney, W. L., Chen, Z., Schwab, A. P., and Banks, M. K. 1998. Greenhouse evaluation of agronomic and crude oil phytoremediation potential among alfalfa genotypes. *Journal of Environmental Quality* 27, pp. 169-173.

From the Time Capsule!

The song below was written for the lab of my Arizona Flora class at Arizona State University. A group of us students sang it in the last meeting of the 28 (!!!) 3-hour labs, Spring 1973 semester.

For the record, Donald Pinkava was the prof—who later did the prickly-pear treatment for *Flora of North America*; Lyle Magill was the teaching assistant; and Elinor Lehto was the ASU herbarium curator.

Eric Sundell

"Boraginaceae with the Fuzz on Top"

(Sung to the tune of "Surrey with the Fringe on Top")

When I try and find you in my key,
Flora here's the way it's gonna be:
First I take position of your ovulary,
Then I calculate your symmetry.

When I key you out Boraginaceae
When I key you out Boraginaceae
When I key you out Boraginaceae
With the fuzz on top,

I won't key you Scrophulariaceae,
I won't key you Palmae or Malvaceae,
Ain't no use to key you Cyperaceae
With the fuzz on top.

The petals are yaller and the sepals are green,
The herbage is glandular pubescent,
With stamens epipetalous, the fruit is an achene,
That is to say a nut that's indehiscent.

Carpel, locule, capsule septicidal,
Placentation axile or parietal,
Inflorescence twice as long as widal,
Oh my eyes will pop
With that sweet Boraginaceae with the fuzz on the top.

Did you say the pericarp was horned?
Wouldn't have no other kind but horned!
Did you say the stems were armed with stipular spines?
Some like spines, the others more like thorns.

When I key you out Boraginaceae
When I key you out Boraginaceae
When I key you out Boraginaceae
With the fuzz on top,

I won't key you Scrophulariaceae,
I won't key you Palmae or Malvaceae,
Ain't no use to key you Cyperaceae
With the fuzz on top.

The wind is awhisperin' in the scorpioid raceme,
A bee's in the sympetalous corolla,
When Lyle and Dr. Pinkava appear upon the scene,
And Elinor preserves it in a folder.

Carpel, locule, capsule septicidal,
Placentation axile or parietal,
Take this lab you must be suicidal,
Cause it just don't stop,
With that sweet Boraginaceae with the fuzz on the top.

P.S. I switched majors from Wildlife to Botany after this course!

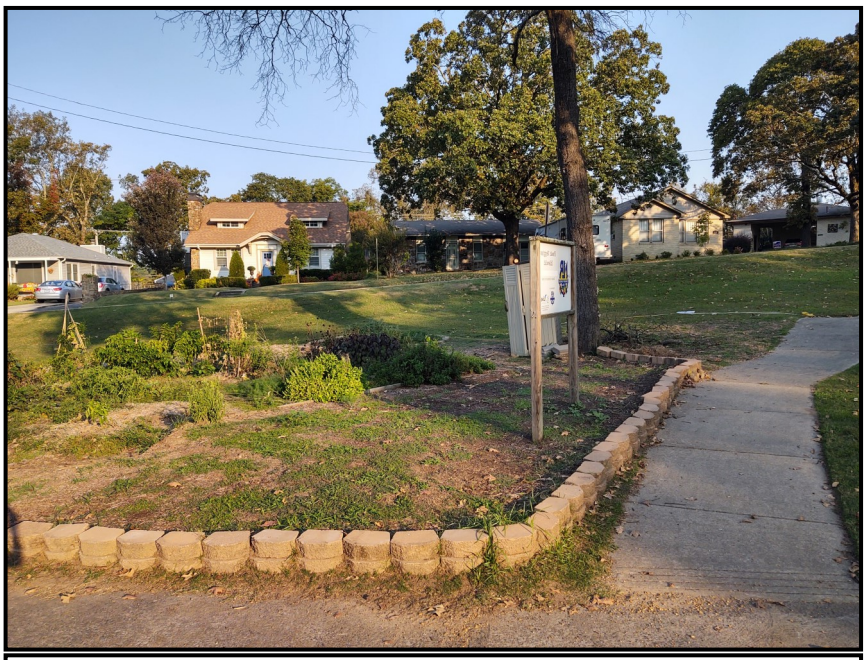
Eric Sundell

Idlewild Community Garden Project Update

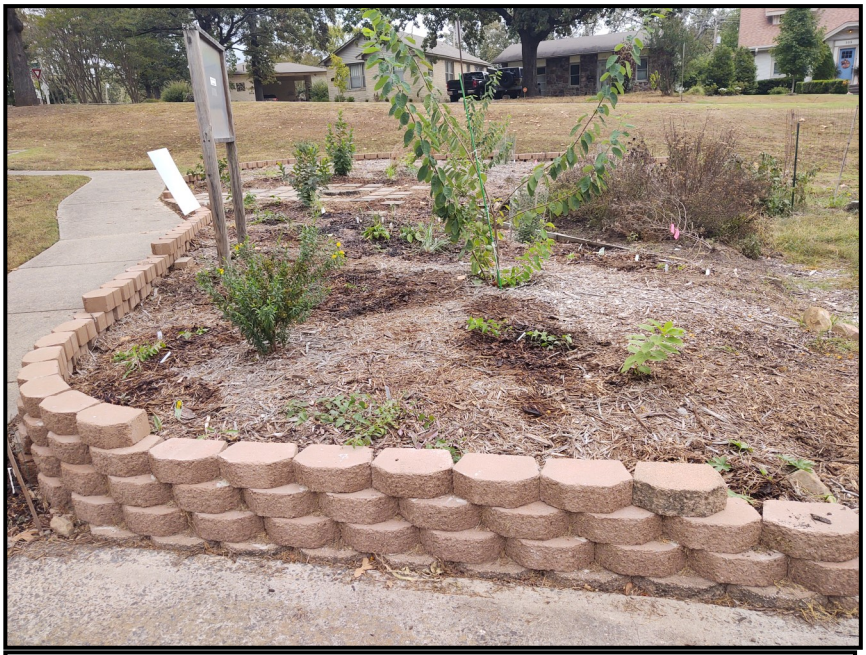
We completed the installation of 100 plants of 16 native species at the Idlewild Community Garden thanks to the Arkansas Native Plant Society Small Grant. The vision of the Idlewild Community Garden has expanded from traditional vegetable and herb beds, to also includeseparate, designated beds for a Native Plant Garden (NPG) and a native edible orchard (NEO). The ANPS Small Grant was used to purchase plants for the NPG and planting occurred in September 2021. The NPG is meant to serve as a neighborhood showcase for native plants, provide educational opportunities for community members to learn about the benefits of native plants for attracting pollinators and pest control, provide a local seedbankfor native wildflowers, and provide a greenspace for native plants, insects, birds, and other animals within the fabric of a suburban neighborhood.

In winter and spring of 2020-2021, we leveraged city garden funds to hardscape and separate the NPG from the surrounding turf grass. The NPG is currently separated from and bordered on one side by a medicinal herb bed, which will be redesigned as part of the NEO (Photo 1). In April 2021, we installed native shrubs--purchased with city garden funds--to provide the major structure of the NPG. In July, we used the ANPS Small Grant to purchase native forbs and grasses; these were potted up and watered throughout the summer to better establish the plants prior to final installation. We held a workday on September 19th 2021 and planted the native plants throughout the NPG.

Shorter native plants and groundcovers--such as Missouri Primrose *(Oenothera macrocarpa),* Hairy Wild Petunia *(Ruellia humilis),* and Prairie Pussytoes *(Antennaria neglecta)--were* planted at the front edge of the hardscape border and around stepping pavers. Taller plants, such as Blue Sage *(Salvia azurea)* and Yellow Coneflower *(Echinacea paradoxa),* were clumped with Little Bluestem *(Schizachyrium scoparium)* in drifts towards the back and middle of the garden to provide height. We have also included Asters , such as *Symphyotrichum patens, Symphyotrichum turbinellum,* and *Eurybia hemispherica,* and Bluestemmed Goldenrod *(Solidago* caesia) to provide late-season blooms. We greatly appreciate the funding from ANPS! If members are interested in visiting the garden in North Little Rock or providing guidance, please do not hesitate to contact the garden at idlewildgardenmgr@gmail.com.



Native plant section of Idlewild Community Garden before project start.



Native plant section of Idlewild Community Garden after make-over to add dirt, raise border, remove grass, and separate from rest of gardens.

ANHC Herbarium Found to House Specimens of Newly Described Species!

Written by Brent Baker, Arkansas Natural Heritage Commission

Sometimes, identifying certain plant species can be intimidating even for those of us supposed plant "experts" called botanists. Despite there not being a particularly large number of species, ladies'-tresses orchids, members of the genus Spiranthes, can be difficult to identify, even though they are probably some of the most widespread and easily recognized orchids in the state, with their spiraling arrays of primarily white or whitish flowers. Some even occasionally pop up in yards! Others are highly restricted to specific natural habitats. However, differences between the individual species and varieties within the group are sometimes subtle and defining characters can be minute, requiring high-powered microscopes to see. Add to this the fact that members of the group often crossbreed, producing a variety of hybrids, some of which have even led to new species. These hybrids or species of hybrid origin may have varying degrees of intermediacy, or they may have unique characters, different from their parents. I, for one, have found ladies'-tresses challenging and have also found myself avoiding them a bit, both in the field and in the herbarium.

When the Atlas of the Vascular Plants of Arkansas was published in 2013, 11 species and varieties of ladies'-tresses were recognized as occurring in Arkansas. In late 2017, one more was added to the list: a newly described species, described from populations right here in Arkansas. The botanist who identified and described it, Dr. Matthew Pace, currently the assistant curator of the William and Lynda Steere Herbarium at the New York Botanical Garden, named the new species Spiranthes niklasii, or Niklas' ladies'-tresses, in honor of Dr. Karl Niklas, a mentor of Pace's. Pace and co-author, Dr. Kenneth Cameron, described the species in "The Systematics of the Spiranthes cernua Complex (Orchidaceae): Untangling the Gordian Knot" published in Systematic Botany. They speculated, based on genetic sequencing, that Niklas' ladies'-tresses originated as an ancient hybrid between nodding ladies'-tresses (Spiranthes cernua) and oval ladies'-tresses (Spiranthes ovalis). Pace and Cameron explained that Niklas' ladies'-tresses very much resembled nodding ladies'-tresses and that herbarium specimens of the new species were often misidentified as such. Pace and Cameron stated that Niklas' ladies'-tresses seemed primarily restricted to the Ouachita Mountains of Arkansas and eastern Oklahoma, but they also identified what they considered disjunct populations in the Boston Mountains and on Crowley's Ridge.

Spiranthes niklasii photo by Eric Hunt.

Although I was certainly made aware of Pace and Cameron's paper and the new species of ladies'-tresses in the state, I didn't really "look into it" much. I was occupied with other work and projects, and somewhat reluctant to get mired in the difficult group, which now included yet another cryptic species. My avoidance, however, recently lapsed while reviewing a specimen donated to the ANHC Herbarium. Virginia McDaniel, a forestry technician and ecologist with the U.S. Forest Service's Southern Research Station, had donated to us a large set of specimens she had collected during plant inventory and research work on Forest Service lands. In the set was a ladies'-tresses specimen she had collected at the Crossett Experimental Forest in Ashley County in Southeast Arkansas. It had been identified as nodding ladies'-tresses, which seemed correct to me, but I decided to go ahead and run it through an updated dichotomous

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key. Used by biologists, a dichotomous key is a series of two-option choices of characteristics or suites of characteristics that lead to the correct name of a species. The updated key contained some of the newer species recently described within the eastern U.S., such as Niklas' ladies'-tresses. To my surprise, the specimen keyed to Niklas' ladies'-tresses rather than nodding ladies'-tresses.

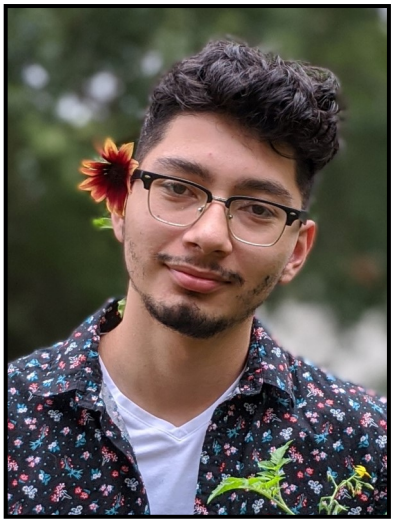
One defining character that separates Niklas' ladies'-tresses from nodding ladies'-tresses is the presence of tiny bumps or bump-like hairs, called papillae, on the central vein of the upper surface of the labellum or lip (the central, lower, and usually larger petal of an orchid flower; plural: labella). Prior to this, I hadn't really been sure I could confidently see or recognize the papillae, and after the plants are pressed and dried to make herbarium specimens it is sometimes difficult to see the inner and upper surfaces of the labella. Not to mention, after drying, the petal tissues can shrivel and crinkle in ways that make it hard to identify bumps or hairs that might have been more evident when the flowers were fresh. Fortunately, though, this was not the case with McDaniel's specimen. Another character of Niklas' ladies'-tresses noted by Pace and Cameron is that the long, narrow basal leaves are usually withered by the time the flowers open, which differs from nodding ladies'-tresses. McDaniel's specimen also exhibited this character, lacking all but one dried up remnant of a portion of a leaf. This specimen record expands the known range of this newly recognized species well into the West Gulf Coastal Plain and indicates that it could potentially be found in other surrounding states.

Intrigued by the surprise determination of McDaniel's specimen and armed with new confidence, I decided to examine the other ladies'-tresses specimens in our collection, particularly those previously identified as nodding ladies'-tresses. Although we don't have an especially large set of nodding ladies'-tresses specimens at the ANHC Herbarium, we do have a selection from scattered localities and habitats from throughout the state. Additionally, we had just received a set of specimens from our avid plant inventory volunteers Jim Keesling and Paul Barnard, who had really developed an interest in the ladies'-tresses this past year and had a set of specimens they had identified as Niklas' ladies'-tresses. It took a fair amount of effort, and although a few specimens remain inconclusive, I was able to find the labellum papillae on many of our specimens formerly identified as nodding ladies'-tresses, as well as on many of Keesling and Barnard's specimens. All but two specimens appeared to have lacked leaves at the time of flowering. Thus, it appears most of the specimens we had previously been calling nodding ladies'-tresses are in fact Niklas' ladies'-tresses. It also appears that this newly described species may be relatively common and widespread in the state, perhaps more so than true nodding ladies'-tresses.

More study is certainly warranted to fully elucidate the two species' distribution and abundance within the state, but hopefully we now have a little better understanding of Arkansas's ladies'-tresses. Or at least, hopefully, maybe I do…unless I've been lulled into a false sense of confidence. Either way, it was an interesting foray!

Photo provided by Brent Baker of Arkansas Natural Heritage Commission.

ANPS 2021 Grant and Scholarship Awards

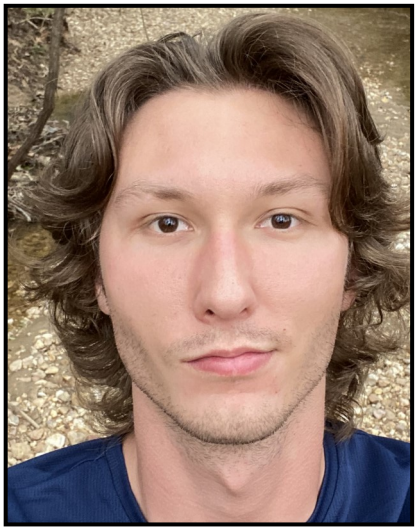


Jonathan Aguirre

Arkansas Tech University
Graduate student (M.S.)
Advisor: Dr. Suresh Subedi
Aileen McWilliam Scholarship
$750

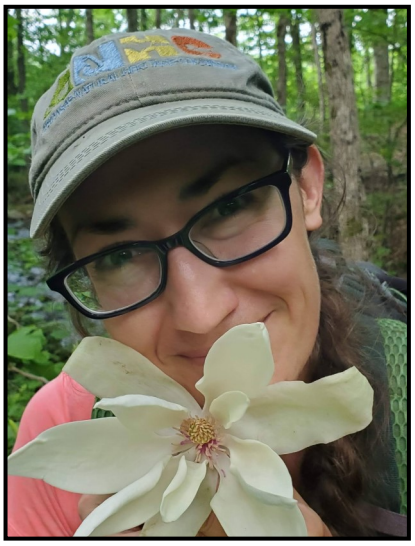
Sam Little

Univ. of Central Arkansas
Graduate student (M.S.)
Advisor: Dr. Erin Wiley
Title of Research: The physiological response of sweetgum (Liquidambar styraciflua) to fire restoration management efforts in Central Arkansas
Delzie Demaree Research Grant
$2,000



Mathew Jones

Arkansas State University
Undergraduate student (B.S.)
Advisor: Dr. Travis Marsico
Title of Research: The influence of soil on plant communities on six Lower Mississippi River islands
Delzie Demaree Research Grant
$2,000

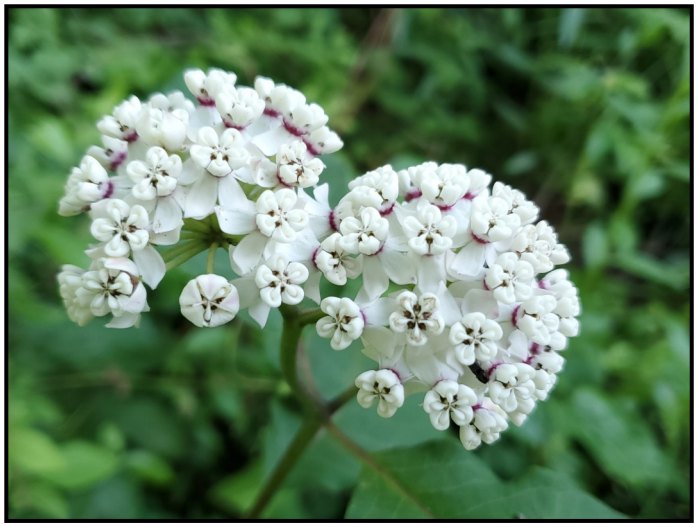


Diana Soteropoulos

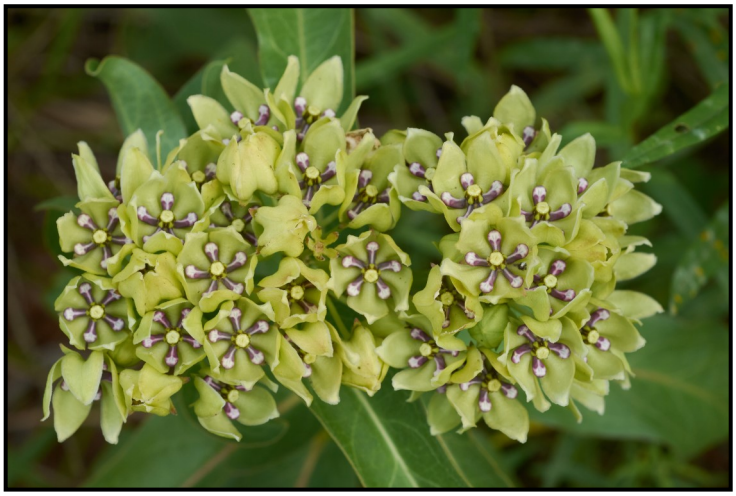
Arkansas State University
Graduate student, (Ph.D. candidate)
Advisor: Dr. Travis Marsico
Aileen McWilliam Scholarship
$2,000

Alexander Gillies
Arkansas Tech University
Undergraduate student (B.S.)
Advisor: Dr. Suresh Subedi
Aileen McWilliam Scholarship
$750

Oldfield Milkvine *(Marelea decipiens)*

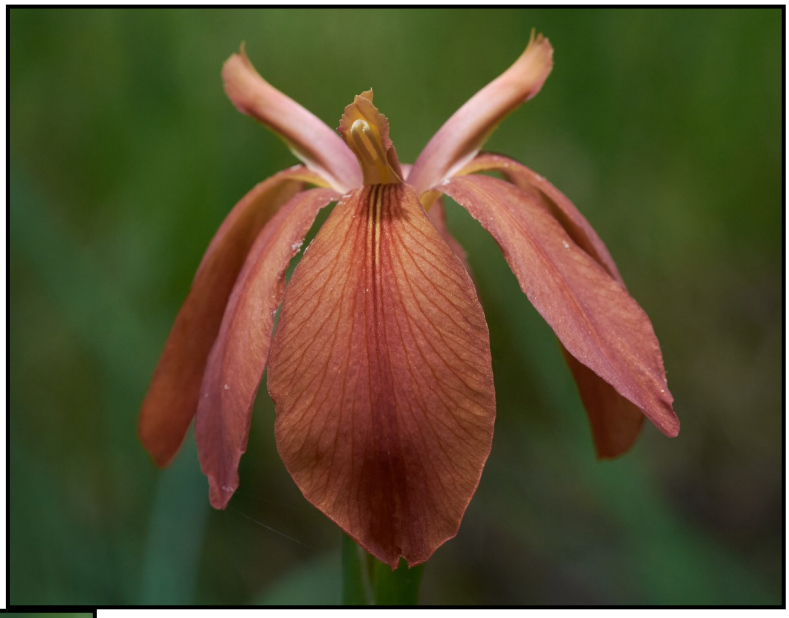


Redring Milkweed *(Asclepias variegate)*



Above: Green Milkweed *(Asclepias viridis)*

Below: Crested Coralroot Orchid *(Hexalectris spicata)*



Above: Copper Iris *(Iris fulva)*

Below: Prairie Blazing Star (Liatris pycnostachya)

All photos by Eric Hunt.

Update on Election of New Officers

In the previous issue of Claytonia, Spring 2021, an appeal was made for nominees for Editor, Vice-President and Internet/Social Media Officer.

The Nominating Committee 2021 was comprised of Becky Hardin, Susan Hardin and Eric Sundell.

From that newsletter appeal we had not one but TWO folks who offered to help put our newsletter together! Brian Lockhart, recently retired from the US Forest Service, agreed to have his name placed in nomination to be Editor and he seems more than qualified to fill this spot.

One of Eric Sundell's students at UA Monticello back in the mid-80's, Brian worked to mount specimens in the Sundell Herbarium there. He received his BS in Forestry at UAM, and after that earned a Masters of Forest Science at Yale University followed by a Ph.D. in Forestry from Mississippi State University.

Recently retired, he's now eager to learn the Arkansas native perennials and meet friendly ANPS members. He's been a long-time member but was always out-of-state, so now that he's retired to the family farm and owner of Hardwood Silviculture, LLC near Gentry, AR, he's ready to hit it!

Welcome, Brian, and it'll be a pleasure for all of us to get to know you whenever we have in-person meetings again. Thanks too for offering to lend a needed hand to be our Editor and give current Editor, Betty Owen, a well-earned break after her seven years of devoted work. In addition to being our Editor, she's also been a most thoughtful, wise, and helpful Board member for us all.

And who is the second person to volunteer to help in the Editor position?

It's five year member Karen Hicks, former K-3 elementary teacher at East End Elementary School in Saline County and graduate of Henderson University.

She retired last year and has since moved to Hot Springs Village where she's busily acquiring and planting natives all about her property. Having lots of milkweed available for monarch butterflies is an important activity for Karen, and she also plants other natives for many butterfly species, as well.

Some of us first became acquainted with Karen at the Adult Ecology Workshops previously held at Ferncliff Camp. These were sponsored by the Arkansas Audubon Society, and newsworthy is that a number of our ANPS members were excellent instructors at some of those workshops.

From the beginning, Karen said she only wanted to assist, so this is perfect for incoming Brian to have someone at the ready to help should he need it. Thank you, Karen, and it'll be fun having you in the loop with us.

And you may have noticed that we also had Internet/Social Media Officer in there, but that's no longer open since our current Officer, Eric Hunt, changed his mind and decided to stay. We're all so grateful to Eric and want to thank him for continuing on with his able posting and maintaining of our social media sites. You're the best!

So that leaves Vice-President, and here we had a problem since no one stepped up and those we contacted were not able to be a nominee at this time. What to do?

Eric Fuselier helped to solve this by offering to put himself back through the officer positions anew, starting with Vice-President next year when he'll also move to the Nominating Committee.

Unusual, yes, but he's most capable and we have no doubt that he'll be able to handle it and, Eric, we're indebted to you.

Also goes to show what a devoted Board we have at ANPS and how the officers all pitch in to keep the organization going as smoothly as possible. These past almost two years have been difficult, but thanks to each and every officer who took on various chores, contributed above and beyond, came up with such great ideas, helped to revise the bylaws, helped to raise money with the various activities, etc., exemplifies the great folks at ANPS.

Once we can have in-person meetings again, elections, for example, will be far easier, so it's not too early at all for you to start envisioning yourself in one of these positions. Let us network with you and give you a better idea of what's involved as the skills needed are surely those that you possess right now. Any of us are also very willing to mentor to get you going in your new spot, so ring us up or email. All members of the Board are here and willing to do whatever's needed for your smooth transition!

ANPS Nominating Committee 2021

Hardin Sisters (Susan and Becky) and Eric Sundell

Election of Officers for Terms Beginning Jan. 1, 2022

Dear ANPS Members,

Below is the ballot with nominees that resulted from our appeal in the Spring 2021 Claytonia. Thanks to those who offered their services, and further information pertaining to these nominees can be found in this issue of Claytonia, Update on Election of New Officers.

This ballot can be returned in various ways:

You can email the results of your completed ballot as a picture, scan, or note to Becky Hardin at rhardin@att.net or text it to 501-584-8545. If mailing your ballot, send to Becky Hardin, 22400 Chandler Road, Little Rock, AR 72210.

If you have questions related to voting, please email, text or call Becky at 501-584-8545.

Voting will end on November 12.

ITEMS REQUIRING A VOTE BY MEMBERS: *(Please circle Yes or No for each item.)*

Kate Lincourt has prepared the budget for 2022 that appears in this newsletter.

I vote to approve the 2022 budget. YES NO

The Board recommends Eric Fuselier for the Office of Vice-President.

I vote for Eric Fuselier to be Vice-President. YES NO

The Board recommends Brian Lockhart for Editor.

I vote for Brian Lockhart for Editor. YES NO

New Members *(March 15 — October 17, 2021)*

Amy Armstrong (Cabot, AR)
Angie Bailey (Bentonville, AR)
Kimberly Buck (Springdale, AR)
Lois Bueker (Hot Springs, AR)
Jackman Byington (Little Rock, AR)
Shirlene Chadick and Rick Head (Bella Vista, AR)
David F. Darby (Kissee Mills, MO)
Lynda Deer (Little Rock, AR)
Paul Deer (Little Rock, AR)
Marcie Finney (North Little Rock, AR)
Gwyn Gregory (Winslow, AR)
Debra Grim (Berryville, AR)
LewEllyn Hallett (Greenland, AR)
Chelsea Hattaway (Little Rock, AR)
Samantha Heller (Rogers, AR)
Sharron Hord (Hot Springs Village, AR)
Dr. Billy Ingram (Harrison, AR)
Elizabeth "Bess" Jenkins (Fayetteville, AR)
Elizabeth Larson (Conway, AR)
Kim Lovely (Russellville, AR)
Jo Anne Martin (North Little Rock, AR)
Debbie Milam (Little Rock, AR)
Pam Morgan (Bentonville, AR)
Barbara Moorman (Fayetteville, AR)
Janet Nye (Maumelle, AR)
Amber Overholser (Taylor, AR)
Ann & Rick Owen (Little Rock, AR)
EJ Pangle (Hot Springs Village, AR)
Jeff Pittman (Mena, AR)
Diane Rice (England, AR)
Shayna Sessler (Little Rock, AR)
Michelle Shellabarger (North Little Rock, AR)
Cathy Shonk (Newark, AR)
O.D. Smith (Russellville, AR)
Madison Srebalus (North Little Rock, AR)
Jay Strong (Little Rock, AR)
Suresh Subedi (Miami, FL)
Chenoa Summers (Jonesboro, AR)
Matthew Tatus (North Little Rock, AR)
Angela Thompson (Maumelle, AR)
Krista Underwood (Searcy, AR)
Linda Vanhook (Little Rock, AR)
Barb Wenger (Bella Vista, AR)
Gwen & Ralph Williams (Bentonville, AR)
Katrina Windon (Fayetteville, AR)
Mary Ann Yaich (North Little Rock, AR)

New Lifetime Members

Bayne, Cathy (Leslie, AR)
Mark Clipper (Rogers, AR)
Michael and Paul Daily (Jackson, AR)
Yolanda Dreher (Little Rock, AR)
Paula Furlough (Little Rock, AR)
Sandy Graue (Sand Springs, OK)
Robert F. Hamilton (Little Rock, AR)
Kenneth Leonard (Bentonville, AR)
Lula Lynch (Hot Springs, AR)
Manske, Rita Ann (Fayetteville, AR)
Leslie Patrick (Conway, AR)
Susan Schulte (Cabot, AR)
Sonya Zimmer (Fayetteville, AR)

Remember to check out the full-color version of the Claytonia by going to the ANPS website, http://anps.org/newsletters/.

2021 Fall Treasurer's Report						Proposed 2022 Budget
			Jan - Oct 11, 2021			
			Start	➔	$24,753.00	
	2020 Actual	2021 Budget	2021 Actual as of Oct 11			
INCOME						
Membership Dues	$5,110.00	$4,800.00	$4,405.00			$4,800.00
Meeting Registration	$0.00	$600.00	$0.00			$1,200.00
Plant/Silent Auction	$0.00	$1,800.00	$597.61			$2,500.00
T-Shirt, Hat, Book Sales	$0.00	$600.00	$810.62			$800.00
Fundraiser: Ozark Society Foundation	$1,000.00	N/A	$0.00			N/A
Spring BioBlitz	N/A	N/A	$3,522.34			N/A
Contributions	$1,405.00	$0.00	$6,356.00			$0.00
TOTAL	$7,515.00	$7,800.00	$15,691.57	➔	**$15,691.57**	$9,300.00
EXPENDITURES						
ANPS.Org (website expenses)	-$99.00	-$111.80	-$99.00			-$111.00
Claytonia (Print & Distribute 2 Issues)	-$1,887.00	-$2,000.00	-$951.53			-$2,000.00
Directory (Print and Distribute)	-$1,136.75	-$1,150.00	$0.00			-$1,150.00
Zoom (for webinar series)	N/A	N/A	-$163.39			-$164.00
Memorial Awards (Awards/Scholarships)	-$4,000.00	-$2,000.00	-$8,475.00			-$3,000.00
Grants/Support to Public Gardens	-$652.06	-$1,000.00	-$4,199.80			-$1,000.00
Meeting expenses (space, copies, speaker,etc.)	$0.00	-$500.00	$0.00			-$1,000.00
Ecology Camp	$0.00	-$500.00	$0.00			-$500.00
Fundraiser: Ozark Society Foundation	-$1,000.00	N/A	N/A			N/A
Bulk Mail	-$235.00	-$235.00	-$245.00			-$245.00
Supplies/postage/brochures/PayPal fees/mis	-$134.28	-$100.00	-$96.84			-$130.00
T-shirts/Hats	$0.00	-$200.00	$0.00			$0.00
TOTAL	-$9,144.09	-$7,796.80	-$14,230.56	➔	**-$14,230.56**	-$9,300.00
		Total as of Oct 11, 2021		➔	**$26,214.01**	
Respectfully submitted by Kate Lincourt, Treasurer						

ANPS MEMBERSHIP FORM

www.anps.org

Membership Categories

_____ $ 10 Student
_____ $ 15 Individual
_____ $ 20 Supporting
_____ $ 25 Family
_____ $ 30 Contributing
_____ $150 Lifetime (age 55+)
_____ $300 Lifetime (under age 55)

Application Purpose

_____ New Member
_____ Renewal
_____ Address Change

_____ **Opt out of receiving a paper copy of the *Claytonia* newsletter**

Name _____

Address _____

City _____ **State** _____ **Zip** _____

Phone _____ **Email** _____

Please mail this completed form with a check made payable to the Arkansas Native Plant Society to:

Katherine Lincourt, Treasurer
2625 Charter Oak Drive
Little Rock, Arkansas 72227

For other membership questions, please contact:

Virginia McDaniel, Membership Officer
anps.membership@gmail.com
(828) 545-2062

The Arkansas Native Plant Society is a non-profit organization.

President's Message
Eric Fuselier

As we continue to battle COVID here in the Natural State, the Executive Board has again decided that the health and safety of our members is of utmost importance to us, and that it would be best to refrain from having an in-person meeting this Fall. Hopefully, as more people receive their vaccinations and booster shots, we will be able to be together again in 2022. In the meantime, it is my duty to inform you of some of the changes to the makeup of our Board.

After seven years of loyal service to the Arkansas Native Plant Society (ANPS), Betty Owen is stepping down as the editor of our newsletter. We are very grateful to Betty for the wonderful job she has done with the newsletter during her tenure, and we hope that you will join us in thanking her. Luckily we've had a member from among our ranks step forward and volunteer to fill Betty's vacancy, and the Board is excited to announce that we have nominated Brian Lockhart, a recently retired botanist for the U.S. Forest Service, to serve as the new editor of our newsletter.

I'd also like to introduce you to my successor, Nate Weston, who will be taking the helm as President of the Arkansas Native Plant Society next year. Nate is a geospatial ecologist for the Beaver Watershed Alliance in northwest Arkansas, an agency he's worked for since 2017. He's been involved with the Ozark Chapter of ANPS for the past several years and currently serves as president of that chapter. Nate graduated from the University of Central Arkansas in Conway with a degree in Environmental Science in 2016, where he also worked as a restoration assistant at the Jewel Moore Nature Reserve, while earning his degree. After graduating from UCS Nate went on to work under Theo Witsell at the Arkansas Natural Heritage Commission as a research assistant conducting field surveys for rare plant species in Arkansas. Nate's passion for native plants shines as he engages the public during the many native plant hikes that he's led in northwest Arkansas over the years. Please join me in welcoming Nate into his new role as president, hopefully at an in-person meeting next year.

Our new President-Elect in 2022 will be Joe Ledvina, a botanist for the Arkansas Department of Transportation (ARDOT). Joe joined ARDOT with nine years of experience in plant ecology and in conducting plant diversity surveys. Joe has previously worked in Virginia as a plant ecologist for the Smithsonian Institution where he managed a long-term grassland restoration ecology project in partnership with Virginia Working Landscapes. Joe is also an active participant in the AR Monarch Conservation Partnership where he represents ARDOT and their initiative to increase habitat for the monarch butterfly along the roadway corridors they manage. I for one think that Joe will be a wonderful asset to the Arkansas Native Plant Society as he continues to climb the ranks to become our President in 2023.

And finally, I'm happy to announce that the Board has decided to continue to allow me to provide monthly programming for you after this year as the new ANPS Program Officer. I've really enjoyed having the opportunity to host experts from across the state for virtual monthly programs that have covered a variety of topics related to the native plants of Arkansas, and I'm excited to be able to continue doing so into the future. You can find recordings of each of these programs on our new YouTube channel by visiting YouTube and searching for "Arkansas Native Plant Society". If you would like to receive monthly announcements for these programs and to have the chance to attend the live presentation, you can email me at ANPS.Programs@gmail.com and ask to be added to the list. So stay tuned, we'll be back. But for now: That's all folks!

Editor's Note:

We would be remiss if we did not thank Eric Fuselier for the amazing job he did as President of ANPS during yet another year without in-person meetings. COVID did not stop Eric from making virtual education options available to the membership. If members could not get to the classes, Eric took the classes to the membership.

Thank you Eric of a job well done!

Claytonia

Spring 2019
Newsletter

Your dues status is on your mailing label.
On the mailing label there will be a number, for example, "21", and this indicates that your dues are paid through 2021. (Life members will have an "LF" on their label).
To renew your membership, please fill in the application for membership, changes of name, address, e-mail or telephone number and mail your dues to the Treasurer:

Katherine Lincourt, Treasurer
2625 Charter Oak Drive
Little Rock, Arkansas 72227

President Eric Fuselier Efuselier@olsson.com 501-231-7455	
President-Elect Nate Weston Nate@beaverwatershedalliance.org 479-879-7489	**Nominating Committee Chair** Susan Harden (501) 584-8455 whizcats@sbcglobal.net Becky Hardin (501) 584-8545 rebeccabutch@aristotle.net
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ANPS Board members continue their work in the remote world we now find ourselves in. Top row: Eric Fuselier, Joe Ledvina, Margaret Lincourt, and Becky Hardin. Middle row: Betty Owen, Mike Burns, Susan Hardin, and Virginia McDaniel. Bottom row: Nate Weston, Jennifer Ogle, and Kate Lincourt (this may or may not be what Kate looks like).

ARKANSAS NATIVE PLANT SOCIETY
Membership, Virginia McDaniel
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Hot Springs, AR 71901

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