Kentucky Native Plant Society
www.knps.org

The Lady-Slipper

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a publication of the Kentucky Native Plant Society

www.knps.org info@knps.org

KNPS Wildflower Weekend 2014: April 11-13 at Natural Bridge State Park

April 11 through April 13, 2014, will find us enjoying the native plants and trails at Natural Bridge and the Red River Gorge! We are still working on scheduling the weekend festivities, but so far we can confirm the following:

Friday, April 19th

Field Trips—8:30 am, 1:30 pm, 4:00 pm, 4:30 PM

7:30 pm—Dr. Ross Clark – "The Future of Plants: bonsai with natives"

Saturday, April 20th

Field Trips—8:30 am, 9:00 am, 1:30 pm, 2:00 pm

6:30 pm - Kentucky Native Plant Society's General Meeting—everyone is welcome!

7:00 pm – Dr. Bill Martin – "The Forests of Kentucky: overview of their past, present, and future"

Sunday, April 21st

Field Trips —9:00am

As usual our field trips will travel all over Natural Bridge State Park and the Red River Gorge Geologic Area, including hikes along the Rock Garden Trail, Whittleton Arch Trail, Sheltowee Trace, and many others. Our trips are led by some of Kentucky's most prominent biologists, both professional and amateur, and range from general wildflower hikes to specialized hikes focusing on woody plants, geology, ecology, and invasive plants.

For more information on the weekend's events or lodging at the park please contact Natural Bridge Park Naturalist Brian Gasdorf at brian.gasdorf@ky.gov!

Dr. William H. Martin has spent decades working on conservation issues in Kentucky. A native of Tennessee, he first came to Kentucky to work in the biology Department of Eastern Kentucky University in 1969, a position he would hold for over three decades. While at EKU he spearheaded the formation of their natural areas program, serving as Director of Natural Areas for many years, and the development of the long-term ecological monitoring of Lilley Cornett Woods in Letcher County, one of the few old-growth forests left in Kentucky. While at EKU, Dr. Martin published dozens of books and papers on forest ecology including the multi-volume "Biodiversity of the Southeastern United States." In 1992 he became the Commissioner of the Kentucky Department for Natural Resources, where he was instrumental in the creation of the Kentucky Heritage Land Conservation Fund Board and served as its first Chairman. After leaving his post with DNR in 1998 he returned to EKU, but retained his chairmanship of the KHLCF by serving as a representative of the Kentucky Academy of Sciences. He retired from the KHLCF in 2013 to complete a book of the forests of Kentucky. Dr. Martin received his BS from Tennessee Technical University and his M.S./Ph.D. in Botany from the University of Tennessee.

TIME TO RENEW YOUR KNPS MEMBERSHIP FOR 2014!
SEE BACK PAGE FOR DETAILS!

KNPS President's Message by Alan Nations

Greetings! I have often written about change, and change will be the focus of this message. The Society has undergone many changes during the last four years. These changes have improved and strengthened us as an organization. The Executive Board's development of a strategic plan in 2009 gave us direction and guidance. Bylaws were updated, digitized and placed on our website. The mission statement was changed to focus on Education, Preservation and Protection of our ecological systems. We developed an annual budget to better manage our operating funds. The Lady-Slipper transitioned to an electronic distribution – an environmentally sound change that resulted in substantial savings. Our website has undergone constant improvements and now gets thousands of hits each month, along with letters of praise from folks all over the country. Our web master, Dave Luzader, deserves special recognition for devoting countless hours updating and improving the website. He is presently digitizing twenty-five years of newsletters, which will soon be available on the website. Membership has grown and dues can now conveniently be paid electronically on our website. Our treasury has grown steadily, making it possible to expand programs in the future and support a yearly budget. The Kentucky Native Plant Stewardship Certification Program, developed three years ago by the KNPS Secretary, Dr. Sarah Hall, has been very well received. The six classes, taught by KNPS members and held at various locations in the Lexington and Louisville areas, have resulted in many new, enthusiastic members.

I have outlined some of the many changes made by our Officers and Executive Board during the last four years. These folks dedicated themselves, despite having very demanding day jobs and family responsibilities. I sincerely appreciate their dedication and support; it has been a pleasure to work with each of them. On April 12th at Natural Bridge there will be more changes as our members elect new officers. We will also be conducting important business that requires membership vote, and I will deliver my parting comments. Make your reservations now and plan to attend. Wildflower Weekend at Natural Bridge is a great place to celebrate the coming of spring, in one of the most diverse and beautiful natural areas in Kentucky. I hope to see you all there. Alan

Inside this issue:

The Lady-Slipper is intended to be published by the Kentucky Native Plant Society [IRC 501(c)(3)] in March, June, Sept., and Dec. Deadlines are the 10th of the prior months, but Editorial Committee members welcome article submissions at any time. Send dues and membership status inquiries to:

Kentucky Native Plant Society Membership, 801 Schenkel Lane, Frankfort, KY 40601
www.knps.org info@knps.org

2014 KNPS Native Plant Stewardship Certification Program

The KNPS Native Plant Stewardship Program was established to provide participants with the following:

- Background knowledge about Kentucky's native plant resources
- Knowledge about threats to native plant resources
- Experience managing for and restoring native plant resources

The full certification program consists of six one-day sessions, and is designed to be completed by one set of participants from start to finish. Three of these sessions are classroom-type courses, and three are field courses. These will be spread out over a six month period, generally one Saturday each month. Each full program offering will be based in one area of the state, but the location will vary over time to allow for participation in different parts of the state. **The 2014 course locations will vary throughout the Lexington area.**

Each session is limited to 15 participants, with on-line registration being open until it is filled (first come first served, on-line payment by credit card required). For this reason, we ask that you check your calendar before registering, and if you know you will be unable to attend more than one course please do not register and wait until another session is offered. Certification is issued when all six classes have been attended. Make-ups can be completed in future sessions.

Cost: $110 ($55 student); This cost includes registration to all six courses, class materials, and a one-year membership or renewal to the Kentucky Native Plant Society.

Questions? certification@knps.org or http://www.knps.org/stewardshipcert.html

2014 KNPS STUDENT RESEARCH GRANTS AVAILABLE

KNPS is pleased to announce the student research grant program, a funding source to support botanical knowledge and understanding in Kentucky. We are pleased to offer awards of $500 for graduate student projects, and $250 for undergraduate projects. Awards will be given for field- based botanical project(s) which contribute to the knowledge of Kentucky's flora or natural communities (with students preferably attending a Kentucky college or university). The grant may be used to purchase consumable supplies and materials such as rebar, herbarium paper, label stock, and topographic maps. The grant may also be used to cover travel expenses. It may not be used to pay time (e.g., labor) for any party. Applications are due by **April 18, 2014**. Applicants will be notified by May 9th. Funding amount may vary depending on the applicant pool (and may include no grants given). Proposals will be reviewed by the KNPS Grant Committee.

Proposals must include:

1. A current resume/curriculum vitae;

2. A proposal (not to exceed two single - spaced typed pages) identifying the research as either graduate or under-graduate, and describing the proposed research and the role the grant would play in the research;

3. An itemized budget; and

4. One letter of recommendation from a faculty member.

Applicants are encouraged to become members of the KNPS, but membership is not required to be awarded a grant. Grant recipients are required to provide KNPS with a short summary of the funded research suitable for publishing in KNPS's newsletter The Lady-Slipper within one year of receiving the grant. Grant recipients are also expected to present their work at the KNPS Fall or Spring meeting, and we encourage presenting their work at the annual Kentucky Academy of Sciences meeting within one year of completion of their research. Submit electronic copies (as Word or PDF attachments) of all items listed above including letter of recommendation (sent separately by faculty member) to: dtaylor02@fs.fed.us

Floracliff Field Studies: Spring Flora of Kentucky

April 19 (Part 1) and May 3 (Part 2)
Instructor: Dr. Brad Ruhfel (EKU)

Phlox at Floracliff; Photo by Beverly James

Cost: $50; This 2-day workshop will focus on the biodiversity of vascular plants in central Kentucky. Morning sessions will cover topics including i) the vegetation of Kentucky, ii) terminology useful for identifying plants, iii) learning to use keys, iv) important resources for plant identification in KY, v) conservation issues, and vi) climate change and its effect on the local flora. Following the morning activities, we will head into the field and participants will be introduced to collection techniques, species identification, and natural history of the spring flora. We will hike through various habitats, so participants should dress appropriately for the field and the weather. Field trips will include Floracliff State Nature Preserve, which is located in the Inner Bluegrass Ecoregion and Maywoods Environmental and Educational Laboratory, which is located in the Knobs Ecoregion. All students will receive a copy of Newcomb's Wildflower Guide.

Brad Ruhfel is an Assistant Professor of Biology and Curator of the Herbarium at Eastern Kentucky University (EKU). His research specialty is plant systematics and phylogenetics and he teaches the General Botany and Plant Systematics courses at EKU.

Pre-registration is required. We are offering 2 scholarships for the workshop. Registration forms, scholarship applications, and additional information are available at: http://www.floracliff.org/fieldstudies.html

The first day will begin at 9:00 am on April 19th at the Winifred W. Haggart Nature Center at Floracliff. Part 2 will get started in the lodge at Maywoods on May 3rd. Overnight lodging is available at Maywoods on May 2nd for interested participants ($8/person/night). Please see http://naturalareas.eku.edu for more information.

To reserve a spot in the lodge, please contact Beverly James at floracliff@aol.com

Funding for Natural Bridge State Park and many other natural areas visited by the Kentucky Native Plant Society is made possible by your generous purchase of a Kentucky "Nature's Finest" license plate from your County Clerk! A $10 donation to the Kentucky Heritage Land Conservation Fund is made from every plate purchased—late year that generated almost $600,000 for the purchase of natural areas open to the public. For more information visit the KHLCF website at:

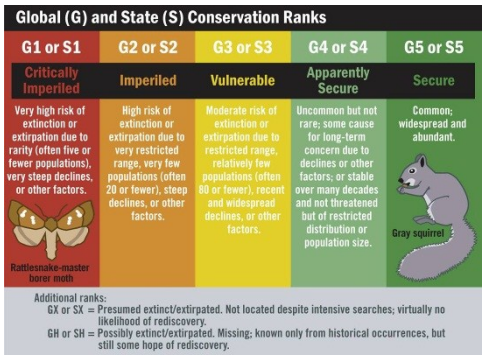
http://heritageland.ky.gov

or find them on Facebook at:

http://www.facebook.com/KentuckyHeritageLands

Botanical Highlights (Rare Plants) from 2013

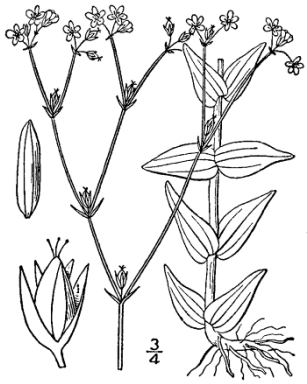
By Tara Littlfield, KSNPC Botanist



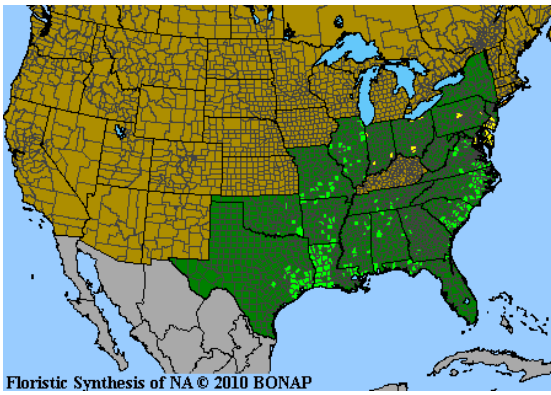
For more information on any of the rare plants highlighted in this report or a list of rare plants in Kentucky, visit the Kentucky Rare Plant Database http://eppcapp.ky.gov/nprareplants/index.aspx. If you find any rare plants, we are always interested! Please contact tara.littlefield@ky.gov. Plants in this article reported by Kentucky State Nature Preserves Commission unless otherwise noted.

To access the Atlas of Vascular Plants in Kentucky by Julian Campbell visit http://www.bluegrasswoodland.com/Kentucky_Plants_Flora.html

Kentucky welcomes Clasping St. John's Wort (*Hypericum gymnanthum,* G4/S1, state endangered) to the flora! It was discovered by KSNPC's ecologist Martina Hines at the edge of a flatwoods community in a shrubby open meadow in Hopkins Co. There were 18 St. Johns Wort's known from Kentucky. Three are state listed, and one is nonnative/naturalized. The Clasping St. John's Wort makes 19 for the state. It's always exiting when a new species is found in Kentucky and is further evidence that exciting botanical discoveries are far from over for our state. Be on the look out for more populations!



In this range map from BONAP, green indicates counties and states where the plant occurs; orange counties are where the plant is rare. Note that Kentucky was not within clasping St. Johns Wort's range, until this past year.



Pictures from:

http://www.illinoiswildflowers.info/wetland/plants/cl_stjohnwort.htm

Kentucky gains a new species to science: Introducing the Kentucky Clover (Trifolium kentuckiense, G1/S1, State endangered). One population is known in Franklin County and one in Woodford County. Remarkably, the two populations of this clover, which is similar to buffalo clover (*Trifolium reflexum*), were found independently by Joe Lacefield from the Kentucky Department of Fish and Wildlife Resources and KSNPC's Tara R. Littlefield. Joe found the first population in 2010 (Woodford County) with Tara finding another population in 2012(Franklin County). After Tara's discovery, there was enough evidence to prove that the species was actually new to science. You can read the technical report through this link:

http://www.phytoneuron.net/2013Phytoneuron/63PhytoN-Trifoliumkentuckiense.pdf

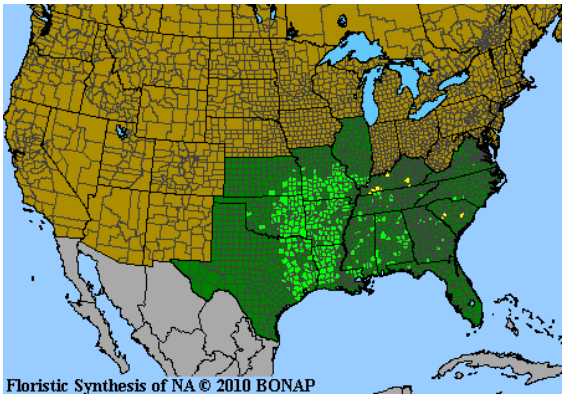
We will be surveying for this species in central Kentucky this year, so hopefully more populations will be found.

Trifolium kentuckiense, showing habit, from the site in Woodford County, Kentucky. Photo courtesy of Joe Lacefield.

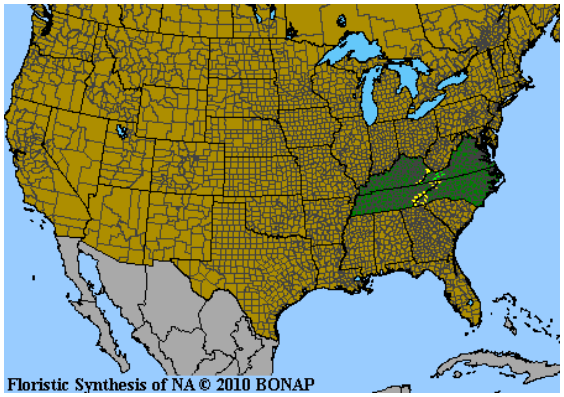
(Continued from page 5)

2013 was another big year for running buffalo clover (*Trifolium stoloniferum, G3, S3*, State threatened, federally threatened). A new county record of Running buffalo clover was discovered in Nicholas county by Larry Brewer, a botanist from Northern Kentucky University. Over the past 5 years, 6 new county records of this federally threatened native clover were discovered! Keep an eye out for this native clover, you never know where it will pop up!

Threadleaf evening primrose (*Oenothera linifiolia,* G5/S1S2, State endangered). A new county record was discovered in Caldwell County. Hundreds of plants were observed growing on sandstone outcrops in a powerline adjacent to a natural xeric acidic woodland. Threadleaf evening primrose is more common in Missouri, Arkansas, Louisiana, Kansas, Oklahoma, and Texas. It is of greater conservation concern east of the Mississippi River.



Range of Threadleaf evening primrose (BONAP)



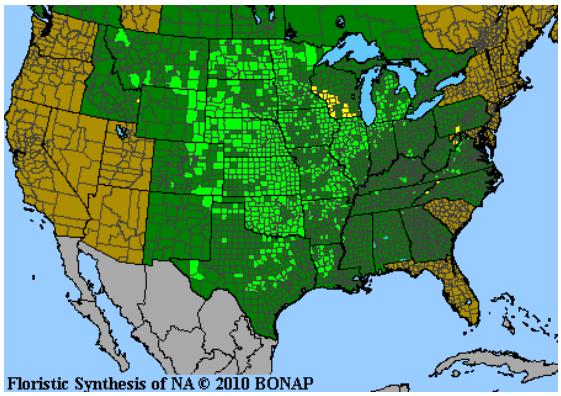
New county record of Steel's eupatorium (*Eutrochium steelei,* G4/S2, state threatened) was discovered in Whitley County on Pine Mountain. Steel's eupatorium, described in 1990, has a small range in the central Appalachians (see range map below). It is listed threatened in Kentucky and is known from Pine, Black and Cumberland mountains in SE Kentucky. This new population extends the known range of Steel's eupatorium to the southwestern end of Pine Mountain.

Range of Steel's eupatorium (BONAP)

Prairie ragwort (*Packera plattensis*, G5, S?). A new county record was discovered in Hart County on a SW facing limestone woodland above the green river. While not on the official state list, prairie ragwort is on the watch list and is still quite rare. We are still assessing its status in Kentucky. For more info visit:

http://www.illinoiswildflowers.info/prairie/plantx/pr_ragwortx.htm

Range of Prairie ragwort (BONAP)



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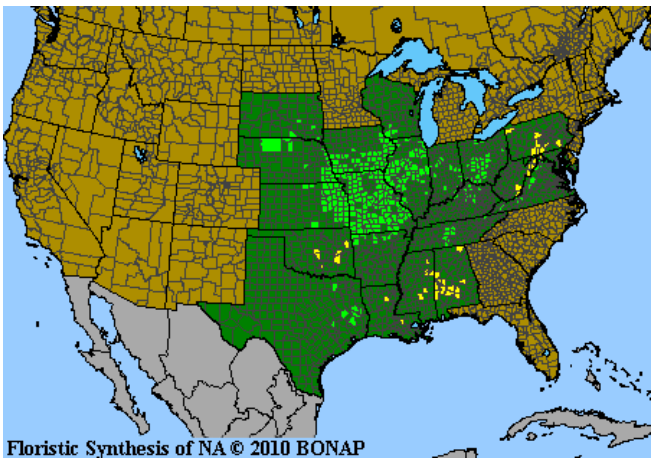
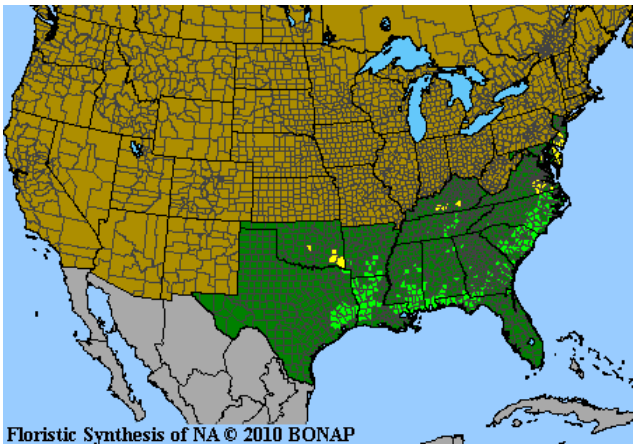
A new county record for lanceleaf buckthorn (*Rhamnus lanceloata,* G5, S4?) was discovered in Cumberland County. While this shrub is not on the official rare plant list for Kentucky, this discovery represents an interesting disjunction from known populations. Most of the lanceleaf buckthorn populations are known from central Kentucky along limestone ravines in the Kentucky River, while the Cumberland county population is disjunct several counties to the south in the Cumberland River drainage. This disjunction makes sense when you look at the known populations in Tennessee, the central basin and the Cumberland River drainage.



Range of lanceleaf buckthorn (BONAP)

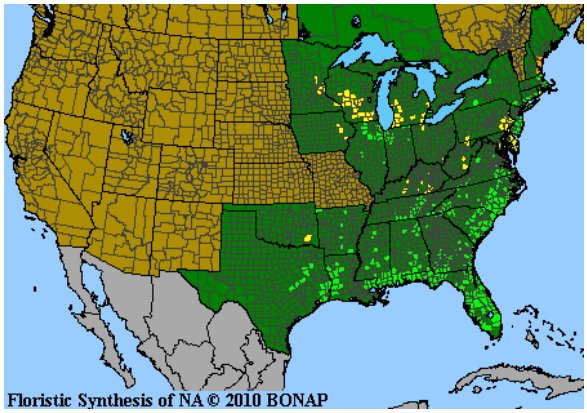


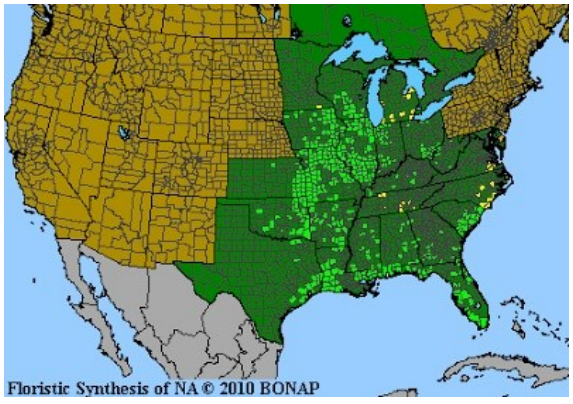
Spindleroot (*Ludwigia hirtella*, G5/S1, state endangered)—a new county record of spindleroot was discovered in a wet meadow within a flatwoods complex in Lincoln county. Spindleroot is primarily coastal plain species. In Kentucky, there was only one extant population in Pulaski County, with a few historic sites in south central Kentucky. This new population increases the extant sites to two.

Range of spindleroot (BONAP)

Crossleaf milkwort (*Polygala cruciata*, G5/S1, state endangered)— new county record of spindleroot was discovered in a wet meadow within a flatwoods complex in Lincoln county. Crossleaf milkwort, also called drumheads, is known mostly from the coastal plain area. In Kentucky, most of the sites are historic, so it is always nice to add a new population to the database of this state endangered plant.

Range of crossleaf milkwort (BONAP)





Prairie milkweed (*Asclepia hirtella,* G5, S?). A new county record in Lincoln County was discovered this past year in a wet meadow within a flatwoods complex. Although this milkweed is not officially listed, it is quite rare. We are looking for more sites that have populations of this milkweed. Do you know where any are? If so, please contact:

tara.littlefield@ky.gov.

Range of prairie milkweed (BONAP)

How can plants serve as indicators of wetland quality?

By Tanner Morris, Eastern Kentucky University

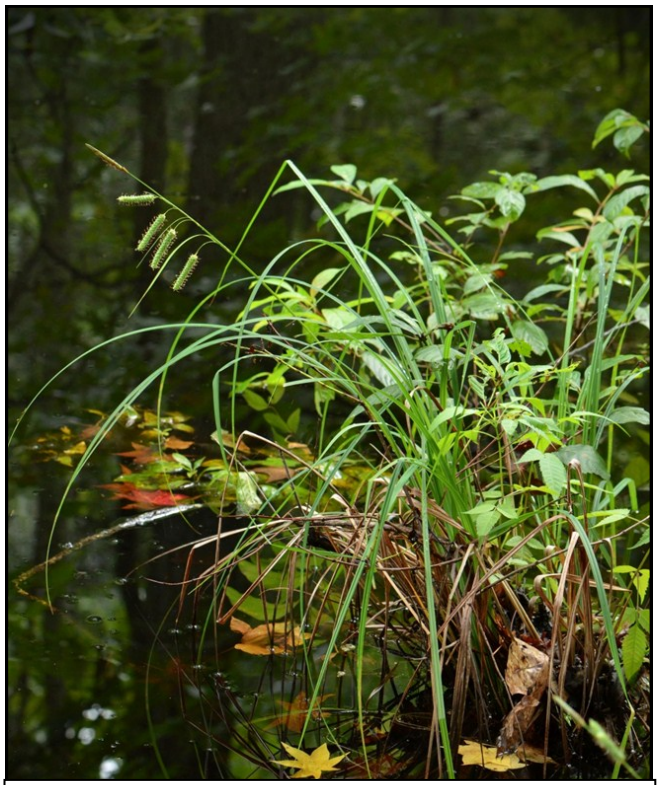
Wetlands are unique and special ecosystems in our landscape. They are capable of providing a large amount of services and functions that benefit us, despite their relatively small size in comparison to other ecosystems. Such benefits include floodwater retention, water quality improvement, groundwater recharge, critical habitat for numerous plants and animals, and recreational opportunities such as hunting, fishing, and bird watching. Despite their many benefits, these unique and fragile ecosystems are easily degraded and destroyed by human disturbances like land development, mining, logging, and agriculture.

In general, higher quality wetlands are able to support higher functions and provide more services than lower quality wetlands. But how do we measure wetland quality? Rather than measure the various functions they provide, the plants found growing in a wetland can actually provide us with a picture of how functional or healthy it might be. Since plants are immobile, they are subject to changes in the surrounding environment and these changes are regularly expressed in the plant community. For example, disturbances that occur in and around a wetland will often lead to an influx of non-native invasive species. Species such as narrow-leaved cattail (Typha angustifolia), common reed (Phragmites australis), Japanese stiltgrass (Microstegium vimineum), purple loosestrife (Lythrum salicaria), bush honeysuckle (Lonicera maackii), Japanese honeysuckle (Lonicera japonica), and multiflora rose (Rosa multiflora) are common invaders of wetland habitats in Kentucky and can colonize disturbed wetlands very rapidly. Their presence is often a signal that a wetland is in poor ecological condition and the wetland may be suffering from major alterations to its hydrology or soils.

There are also whole hosts of native wetland species that can survive and persist in disturbed conditions as well. These species are classified as tolerant, and tend to be very common since they are not picky about which wetlands they grow in. Species such as fox sedge (Carex vulpinoidea), Frank's sedge (Carex frankii), blunt spike-rush (Eleocharis obtusa), box elder (Acer negundo), green ash (Fraxinus pennsylvanica), broad-leaved cattail (Typha latifolia), rice-cutgrass (Leersia oryzoides), jewelweed (Impatiens capensis), and devil's beggarticks (Bidens frondosa) are all tolerant of disturbance and are nearly ubiquitous in wetlands. Their presence often indicates some sort of past disturbance, especially when found growing with invasive species. A wetland dominated by tolerant species would likely be termed as low quality.

Native wetland species that are classified as sensitive almost exclusively grow in relatively undisturbed and intact wetland ecosystems. These species are often the first to disappear from a wetland once disturbances occur, since they typically require a specific set of conditions that are only found in undisturbed settings. Some wetland species which are classified as sensitive are Muskingum sedge (Carex muskingumensis), cattail sedge (Carex typhina), brome-like sedge (Carex bromoides), Canada rush (Juncus canadensis), white turtlehead (Chelone glabra), marsh mermaid-weed (Proserpinaca palustris), swamp rose (Rosa palustris), swamp white oak (Quercus bicolor), and swamp chestnut oak (Quercus michauxii). A wetland containing several sensitive species would indicate an intact and undisturbed ecosystem and likely be classified as high quality. Not surprisingly, nearly all wetland species on the state-threatened and endangered species list are also classified as sensitive species.

This approach of using plants to assess wetland quality is what I am currently working on for my master's thesis at Eastern Kentucky University and in coordination with the Kentucky Division of Water. Since the state of Kentucky currently has no standardized method to assess and quantify wetland quality using vegetation, my hope is that my research can one day be used to help policymakers make decisions about wetlands and perhaps allow higher quality wetlands to be regulated and protected at a higher threshold.



Cypress swamp sedge (*Carex joorii*), grows in a high-quality natural pond in southern Kentucky. This state-endangered and sensitive species requires undisturbed habitats to survive.
Photo by Tanner Morris.

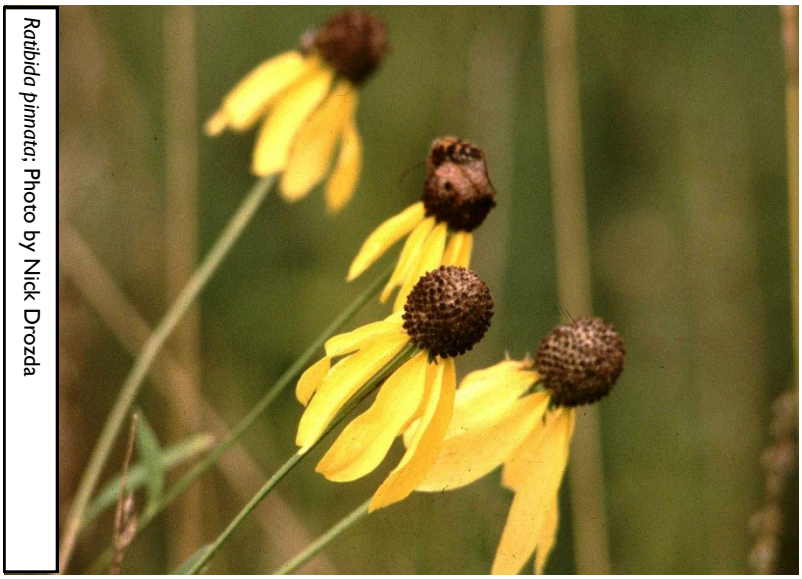
How Native Plants Can Help Your Veggies

By Margaret Shea, Dropseed Nursery

Are you shocked to hear that there are 4,000 bee species native to the US? I was! Pests and diseases have hurt populations of imported Honey Bees over the past several years, causing farmers to worry about pollination of their crops. Many vegetables and fruits require pollination by bees, and insufficient numbers of bees can be one reason for reduced crop yield. You can increase the abundance of native bees in your vegetable patch or farm by providing them with food and habitat.

Symphyotrichum novae angliae; Photo by Tom Barnes

A couple native bees you might be familiar with are Bumble Bees and Sweat Bees. Some bees that were new to me include the Mason Bees, Adrenid Bees and Leafcutter Bees. These native bees nest in the ground, wood, or hollow plant stems. Many of the native bees are solitary and do not live in a large hive like the honey bees. Since they do not have a hive to protect, native bees tend to be less aggressive and are unlikely to sting. Having some untilled soil and other vegetation around your vegetable garden will provide habitat for these bees. Growing native plants near your vegetable garden will provide additional nectar and pollen - attracting bees and allowing their populations to grow. A source of water is also important for native bees as well as honey bees.



Ratibida pinnata; Photo by Nick Drozda

Native plants that are especially attractive to bees include: Golden Alexanders, Hairy Beardtongue, Culver's Root, Bee Balm, Slender Mt. Mint, and Smooth Blue Aster. Using a mix of species that flower throughout the season will give bees a constant source of food, and keep them near your vegetable garden throughout the growing season.

Lobelia puberula; Photo by Tom Barnes

There are other insects that are good to have around your vegetable garden – and native plants can draw these species in as well. Insects like Lady Bugs and the Minute Pirate Bug are predators, eating pest insects like aphids, whiteflies and mealybugs. Other beneficial insects are called parasitoids – these insects lay their eggs in a host insect - their young eat and kill the host. Many parasatoids are wasp species, although these wasps do not sting. Parasitoids can kill pests like caterpillars and beetles. Beneficial predators and parasitoids also feed on nectar and are attracted to species including Rattlesnake Master, Boneset, New England Aster, Cup Plant, Blue Lobelia, and Yellow Coneflower. Growing these plants near your vegetable garden can help to create a balanced system, with pest insects under control. Plus, make it much prettier!!

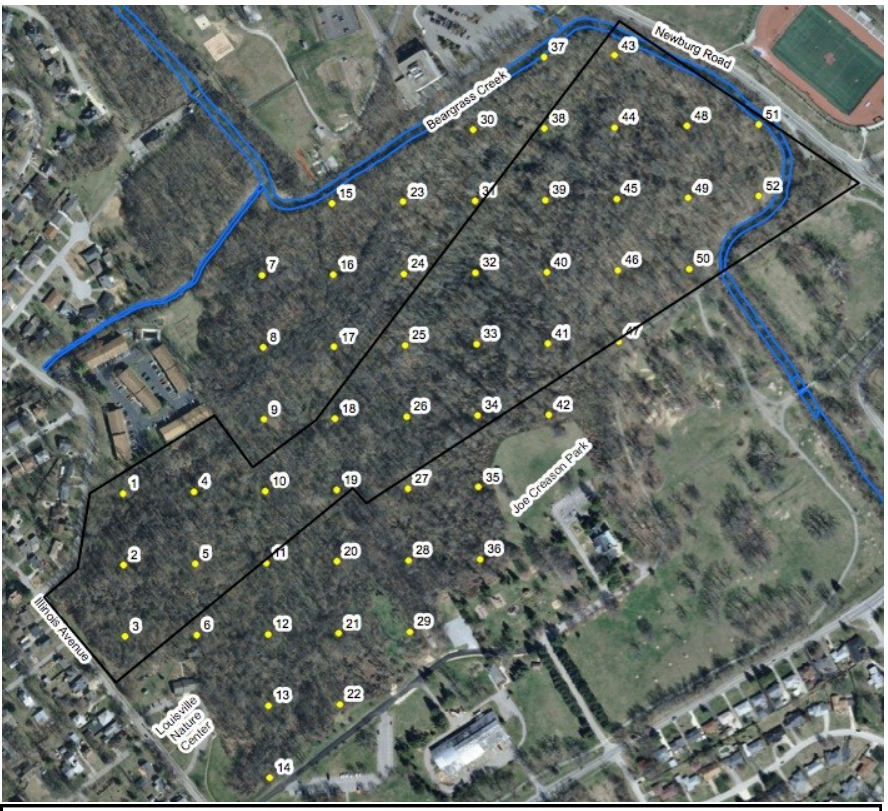
Michigan State University has some helpful publications on beneficial insects that you can download online at:

http://nativeplants.msu.edu/publications.htm#1

Invasive Plant Surveys and Restoration Planning at Beargrass Creek State Nature Preserve

By Laura Darnell, Redwing Ecological Services, Inc.

Last year was an exciting year to volunteer at Beargrass Creek State Nature Preserve, a 41-acre woodland in central Louisville. The Kentucky State Nature Preserves Commission owns the site and manages it cooperatively with the Louisville Nature Center, which has offices and a classroom next to the site. Beargrass Creek State Nature Preserve (BCSNP) was founded in 1982 and contains a mile of hiking trails in two loops. It adjoins other wooded properties owned by Louisville Metro Parks, the Louisville Zoo, and Bellarmine University. People of all ages use the site for nature walks, bird watching, school field trips, and exercise in a peaceful outdoor setting.



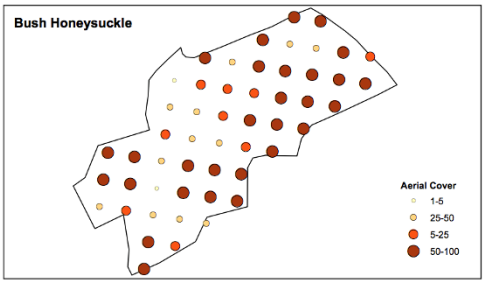
View of Beargrass Creek State Nature Preserve and surrounding forests. The preserve boundary is outlined in black.

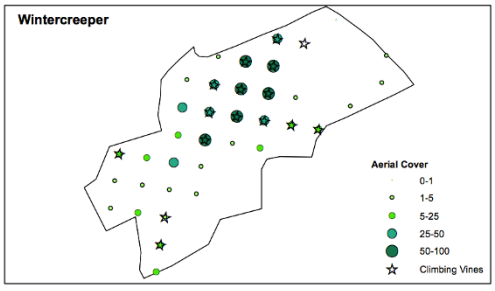
In 2013, a group of staff and volunteers worked together to start a systematic program of invasive plant management on the preserve, and I volunteered in an invasive plant survey of the preserve. The goal of the survey was to map the invasive plant populations and look for patterns based on different environmental conditions. We would use the results to plan invasive control work in the future.

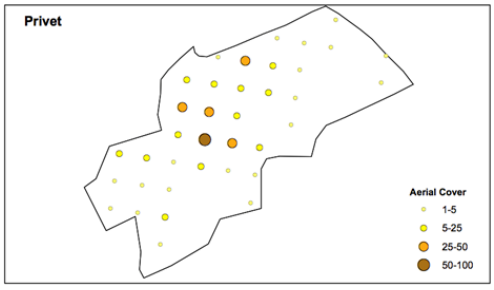
For the survey, we created a grid of points using mapping software, then used a global positioning system (GPS) unit to walk to each point and record conditions there. We recorded what invasive plants were present, the density of the tree canopy, and what native species were present. Other volunteers or land managers could do a similar survey on their own site using free Google Earth software (earth.google.com), a handheld GPS unit, and a free software program such as Load My Tracks (http://www.loadmytracks.com) to transfer data between the GPS and a computer.

The three most abundant invasive species on the preserve are bush honeysuckle, privet, and wintercreeper. The survey found that bush honeysuckle is widespread across the whole preserve, but privet and wintercreeper are more localized to a central area that has shady and wet conditions.

We were also able to use historical aerial photos for a view of the preserve over the past few decades. In Louisville, historic aerial photos from 1937, 1956, 1973, and 1982 are available for copying or scanning at the Jefferson County Soil and Water Conservation District office (http://www.jeffcd.org/). In the 1937 photo, we found that the two parcels that make up the preserve were mostly wooded, but the surrounding areas were more open. When we walked the oldest forests in the preserve, we found that the lower hillslopes had many nice oaks over two feet in diameter and pockets of spring ephemeral wildflowers like trout lilies and Dutchman's breeches. In some areas of older forest, spring ephemeral wildflowers seem to be dormant in the soil, suppressed by the invasive shrubs. We have seen cutleaf toothwort and other wildflowers reappear in some rich areas where bush honeysuckle has been removed.







Survey results for bush honeysuckle, privet, and wintercreeper in the preserve and the surrounding forests.

The Lady-slipper

In the younger woods surrounding the preserve, we observed mostly fast-growing softwood trees like box elder and green ash, and fewer different wildflowers.

After completion of the invasive plant survey, we developed an invasive plant management plan using a template from The Nature Conservancy's Wildland Invasive Species Program (available at http://invasive.org/gist/products.html.) The template sets up a systematic approach that asks planners three main questions: (1.) What are the purposes and goals for the site?; (2.) How are invasive plants interfering with these goals?; and (3.) What species of invasive plants are present on the site, and how abundant are they?

The template helped us to develop priorities based on the specific resources and problems at our site. At BCSNP, one of the biggest assets of the preserve is that it is so accessible for urban residents to enjoy nature. The Louisville Nature Center has a classroom next to the preserve, and hosts several school field trips and community programs in the preserve most weeks.

Together, our group of staff and volunteers decided to prioritize areas that were used more often for environmental education, and that were closer to the Louisville Nature Center. We also prioritized areas with mature oaks and native paw-paw and spicebush patches, which would be ready to fill in the understory when invasive shrubs were removed.

We have made it a priority to eradicate two invasive species that are just getting started on the preserve: jetbead and celandine buttercup. Volunteers will be patrolling the area to watch our current infestations and find new ones, so they can be controlled. Finding new infestations of invasive species is important on any site, and anyone interested in reporting invasive plant sightings can contribute data for their location. A great website for this is the Early Detection and Distribution Mapping System (EDDMaps) at http://eddmaps.org/.

We were able to put our invasive plan to work when the preserve was invited to participate in a Days of Service event with the Future Farmers of America Convention. Around 160 FFA students came to the preserve on October 31 and November 1, 2013 and removed bush honeysuckle and wintercreeper for a service project. Many other volunteers have contributed many hours of work in the preserve throughout the year.

The preserve staff and volunteers are working to keep momentum going in 2014. We will be planning regular volunteer days to follow-up in the invasive treatment areas, and expand into new areas. The first volunteer day of 2014 will be Saturday, March 1. Volunteers of any experience level are appreciated! We will post other volunteer days on the Louisville Nature Center website at http://www.louisvillenaturecenter.org/.

As we worked through our plant survey and management plan, we were able to develop methods and templates that could be used for other restoration planning and inventory projects. This was a labor of love, and we would be glad if other people could use our work! If anyone is interested in instructions for GPS plant surveys or invasive plant reporting, or if you would like to obtain a copy of the BCSNP management plan, please contact Laura Darnell at la.darnell2@gmail.com.

The Genetic Health of *Magnolia tripetala*—A Native Kentucky Tree

By: Victoria Gilkison

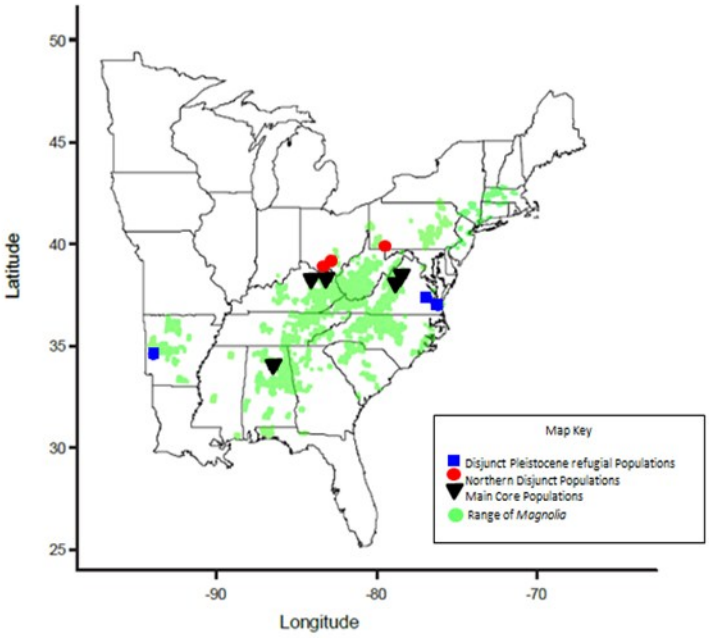


Figure 1: Range map of *Magnolia tripetala*. The colored shapes denote sampling locations.

The range of the *Magnolia tripetala* is an example of a shift in the main core. During the last major glacial time period known as the Pleistocene, *Magnolia tripetala* was mainly limited to small, isolated, refugial areas in Arkansas (suggested by McWilliam 1966), Florida and Virginia (Harvel Jr. 1975, Donna Ware), and certain regions of the Appalachian Mountains such as the Tunica Hills in Louisiana (Delcourt and Delcourt 1975). When the Pleistocene ended and temperatures warmed, *M. tripetala* dispersed away from the refugial areas leaving disjunct refugial populations behind and creating new disjunct populations at the margin of the shifting core—the core being the area with the highest population density. Today, the main core of *M. tripetala* stretches from Alabama to Kentucky and east into North Carolina with numerous disjunct populations bordering the core (Fig.1).

Long distance dispersal aided in the quick dispersal of *Magnolia tripetala* and led to the formation of disjunct populations further north of the core in areas such as Ohio and Pennsylvania. Long distance dispersal occurs via the infrequent aid of factors such as mammals, birds, flowing bodies of water, and heavy wind storms. Disjunct populations are often of great interest to population biologists and of great concern to conservation biologists (Kikuchi and Isagi 2002). While plant populations near or at the Pleistocene refugia have been shown to have high levels of genetic diversity (Barrington and Paris 2007), population genetic theory predicts that disjunct populations formed via long distance dispersal will have lower genetic diversity.

The maintenance of genetic diversity is very important for the long-term persistence of populations. Low genetic diversity can decrease a population's overall fitness, and lower a population's ability to adapt to future competitors and poor environmental conditions therefore making the population more susceptible to extinction (Pluess and Stöclin 2004, Vellend and Geber 2005).

My goal for this study was to compare the genetic diversity of populations belonging to disjunct Pleistocene refugial populations and northern, disjunct populations to populations belonging to the main core to determine if disjunct populations of *Magnolia tripetala* were being threatened by low genetic diversity.

With the help of funding from Kentucky Native Plant Society, and Western Kentucky University, and knowledge from various contacts across the Eastern United States, I was able to collect leaf tissue from eleven different populations covering six different states including Kentucky. Of the samples denoted as northern disjunct, one population was collected from Pennsylvania and two were from Ohio (Fig. 1). Of the samples denoted as main core, two populations were collected from Kentucky, two populations were from Virginia east of the Appalachian Mountains, and one of the populations was from Alabama (Fig. 1). Of the disjunct Pleistocene refugial populations, two populations were collected from Virginia, and one was collected from Arkansas (Fig. 1).

Once obtained, DNA was extracted from each leaf (nearly 204 leaves total), and microsatellites were analyzed to determine genetic diversity of each population. Despite warnings of low genetic diversity, northern disjunct populations (shown in red in Fig. 2) were shown to have no significantly different levels of genetic diversity than the main core populations. The Pleistocene refugial populations (shown in blue in Fig. 2) were also found to have no significantly

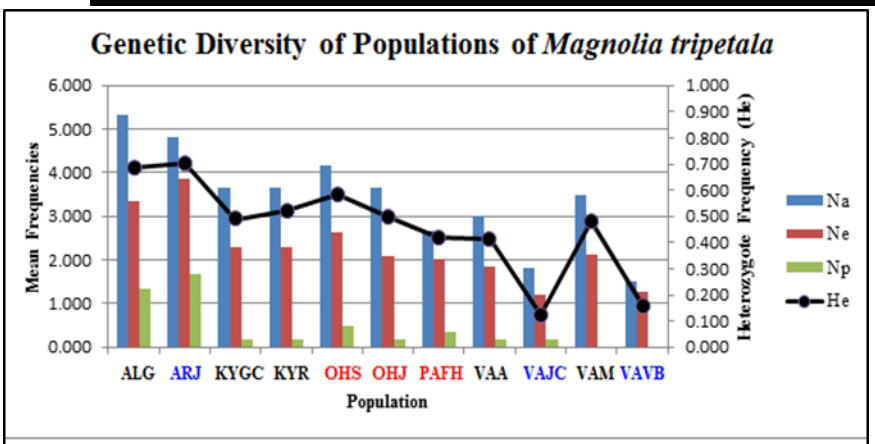


Figure 2: Genetic diversity of each population of *M. tripetala* as defined by four major parameters: the number of different alleles belonging to a population (Na), the number of effective alleles belonging to a population (Ne), the number of private alleles belonging to a population (Np), and the number of expected heterozygotes for each population. Pleistocene refugial populations (ARJ, VAJC, and VAVB) have been labeled in blue. Main core population (ALG, KYGC, KYR, VAA, and, VAM) have been labeled in black. Northern disjunct populations (OHJ, OHS, and PAFH) have been labeled in red.

different levels of genetic diversity than the main core.

If you take a closer look at Figure 2, you will notice that all populations have very similar Na values or the number of alleles in a population. Alleles pertain to the number of different forms of a single gene in an organisms DNA. The more alleles present, the more genetic diversity present in that organism. The black line representing the percentage of heterozygous individuals (individuals having more than one allele for a single gene) is also very similar for most of the populations. There does however, appear to be low heterozygosity in two of the refugial populations—VAJC and VAVB. You will also notice that some populations have a fairly high Np value whereas other populations have very low. Np values represent the number of private alleles that pertain to only that population and none other. These values show that there is some variation in the amount of genetic diversity present in the populations; however once again statistical tests showed that there were no significant differences overall.

Considering the low sample size of this study (twenty trees per population at best), it can be concluded that the genetic diversity of the Kentucky native plant *Magnolia tripetala* is healthy despite having numerous disjunct populations. At the present, the species is not under a threat of genetic deterioration.

Once again I would like to thank Kentucky Native Plant Society for its funding, Western Kentucky University for its funding and resources. For all your help on locating and obtaining samples, thank you to Paul Weigman, Rick Gardner, Scott Freidhof, Derrick Heckman, Virginia McDaniel and especially Donna Ware for helping me obtain samples. Without you guys, this project certainly would not have been possible. And lastly, thank you to my advisors Dr. Meier and Dr. Johnson.

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Picture of *Magnolia tripetala* obtained from:

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Potential for Local Use in Restoration of *Rosa palustris*, Swamp Rose

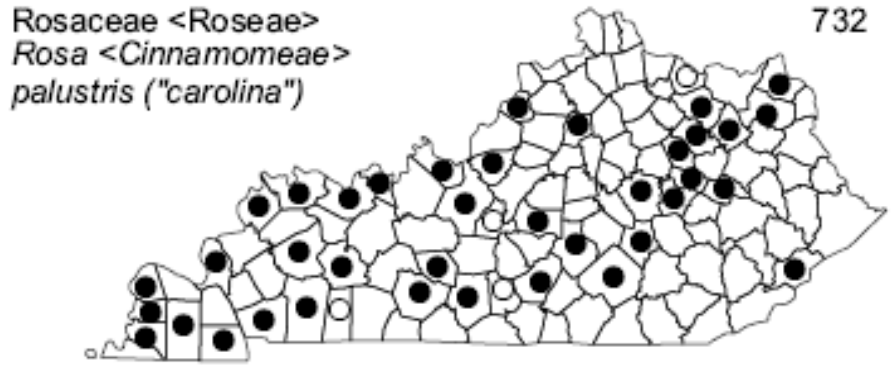
By Julian Campbell, Bluegrass Woodland Restoration Center

This is a bushy rose with fragrant flowers in June to July, reaching 5-6 ft tall, and spreading with underground runners. It occurs in swampy sites across most of the state, especially open woods and edges. The species is curiously uncommon within the Bluegrass region, where it is restricted to a few of the better remaining wetlands. Plants prosper here in cultivation, so the soil does not appear to be a major problem, but more acid or less fertile conditions are prevalent elsewhere where it grows. It is also possible that intensive browsing by herbivores, including livestock, has eliminated the species from much of the region. Although thorns offer some protection, most roses are highly palatable and can be reduced by browsing. Young shoots are remarkably red, perhaps a warning to herbivores (or even mimicking poke).

Although easily grown from rooted divisions, swamp rose is not widely available from nurseries. Buyers should be aware that an increasingly popular cultivar known as "var. *scandens*" is not a wild type, but appears to have hybrid origin; that plant tends to climb and it has doubled flowers. Further trials are needed with local material, as are being initiated in Lexington. The UK Arboretum has some large clumps, originally collected by the author from Pulaski Co. in 1986. Such plants can become a problem in gardens, but they may be ideal for keeping people out of a wetland, if that is desired!

Taxonomic Notes [adapted from the Atlas of Kentucky Plants]

Rosa palustris is a diploid that is widespread on wet lowlands across most of eastern North America, but concentrated on somewhat acid (or oligotrophic) soils. It is uncommon to absent west of the Mississippi Rv. and on the Gulf Coastal Plain, and in Ky. it is absent from most of the Bluegrass region. *R. palustris* differs from *carolina* in its stouter, often hooked, infrastipular stipules (suggesting *virginiana*), its stipules with a longer adnate ("caniculate") portion, and its leaves with more numerous, finer serration. The related southwestern species, *R. foliolosa* Nutt. ex. Torr. & Gray, has more numerous, elongated leaflets, and may be expected in w. Tenn and w. Ky. A report of the more northern species, *R. blanda* Ait., was based on a misidentified coll. of *palustris* from Edmonson Co.



Unusual Features

Young shoots within large clumps of swamp rose often develop bright reddish color (see left). Such strong coloration is virtually unknown in other roses, and is suggestive of the reddish or purplish hues displayed by poke (*Phytolocca americana*), water hemlock (*Cicuta maculata*), poison hemlock (*Conium maculatum*), *Angelica atropurpurea* and red osier (*Cornus stolonifera*). One might hypothesize that these colors have evolved to warn herbivores of thorns or toxins in the vegetation before they charge in to browse, piercing their eyes or poisoning their guts.

Horticultural Details [from MO Botanical Garden website]

This species rose is generally not susceptible to the disease and insect pests that attack many of the hybrid roses. Best grown in slightly acidic, organically rich, boggy to wet soils in full sun. Tolerates light shade, but best flowering and disease resistance generally occur in full sun. Plants will not grow in standing water, but will tolerate some seasonal flooding. Good air circulation promotes vigorous and healthy growth and helps control foliar diseases. Prune as needed in late winter. Plants slowly spread by suckers. Softwood cuttings should be taken with a heel and treated with hormone. Rose seeds should be taken from the hips as soon as ripe and planted in the open or stratified before planting. Hips can be collected as soon as they are ripe.

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NatureServe.org (2014), and other literature on vegetation. [Providing detailed notes on associates, including species of Alnus, Amorpha, Betula, Cephalanthus, Cornus, Fraxinus, Myrica, Morella, Nyssa, Salix., Sambucus, Spiraea, Taxodium, Viburnum, etc.]

http://www.plantsystematics.org/imgs/kcn2/r/Rosaceae_Rosa_palustris_15436.html

http://climbers.lsa.umich.edu/?p=2647

http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=e834

Rosa palustris, Swamp Rose [https://www.prairiemoon.com/images/D/Rosa-palustris-Swamp-Rose-flowers.jpg].

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The Kentucky Native Plant Society was founded in 1986 for everyone interested in the native plants, trees, and wildflowers of Kentucky. Plants are essential to both the well-being of our Commonwealth's natural ecosystems and our enjoyment of its unique environment. With members in Kentucky and neighboring states, the Kentucky Native Plant Society is a leader in promoting education about, appreciation for, and conservation of the native flora of our Commonwealth.