



Kentucky

Volume 13 Issue 1

Woodlands

Magazine

American Chestnut: Kentucky Update

Daniel Boone National Forest

Natural Resources Conservation Service

Kentucky Woodlands

Volume 13 Issue 1 Magazine

Winter 2019

Promoting stewardship and sustainable management of Kentucky's family forests.

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Editors's Note: We are also pursuing the use of SFI paper produced on SFI certified and American Tree Farm System certified land.

From the Editors of the Kentucky Woodlands Magazine:

You might say we literally "branched" out with this issue. There are new articles from some of our woodland partners including the American Chestnut Foundation, Daniel Boone National Forest, Kentucky Natural Resources Conservation Service, Kentucky Watershed Basin Coordinators and their respective programs. These partners bring and contribute a wealth of forest management support to the Commonwealth. We hope to bring more information about these woodland partners in future issues of the magazine. Secondly, there are articles from Dr. Laura DeWald concerning the white oak genetics project that has been started at UK and the continued White Oak Initiative work being done by Dr. Jeffery Stringer and Darren Morris, White Oak Coordinator for the southern region. There is also information on outreach and education efforts such as the Woodland Owner Webinar Series and From the Woods Radio Show. Both are tremendous forestry programs for everyone. Thirdly, there is a new section for the Kentucky Division of Forestry. It is simply called KDF Corner. We will be writing about division news. This issue also includes an article about the Forest Inventory and Analysis program and its importance. The magazine will continue to host its regular columns from KY Woodland News To Use, KWOA, Forestry 101, Wildlife 101, Forest Health, and Kentucky Tree Farm Committee. Our goal was to break away from the traditional articles written in the past and to broaden the woodland partner list to encourage and strengthen forest management across the state. Hope you enjoy this latest issue!



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About the Cover: The cover image of Buffalo Branch in the Daniel Boone National Forest was taken by Kelley Corbine, a forester with the US Forest Service. To learn more about the Daniel Boone National Forest make sure to check out the article on page 5 of this issue or visit www.fs.usda.gov/dbnf/

Photo courtesy: Renee Williams



The Kentucky Natural Resources Conservation Service and the Kentucky Division of Forestry are key agencies who support sustainable forest management in Kentucky.

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American Chestnut: A Kentucky Update

by Lynn Garrison and Jared Westbrook



Prior to the introduction of the exotic pathogens root rot (*Phytophthora cinnamomic*) and chestnut blight fungus (*Cryphonectria parasitica*), American chestnut (*Castanea dentata*) was a widespread canopy species in the Eastern deciduous forest.

It was a large, fast-growing tree that could exploit openings in the canopy by rapidly reaching the canopy before the canopy closed. Due

to its control of population and community dynamics as well as ecosystem process it functioned as a foundation species. It was an integral component of forest ecosystems that provided habitat and abundant food for wildlife and people. A late-flowering tree unaffected by seasonal frosts, it produced fruit annually with little variation from year to year. Chestnuts were a reliable food source for birds such as wild turkey and blue jays and for mammals such as squirrels, deer, chipmunks, and bears.

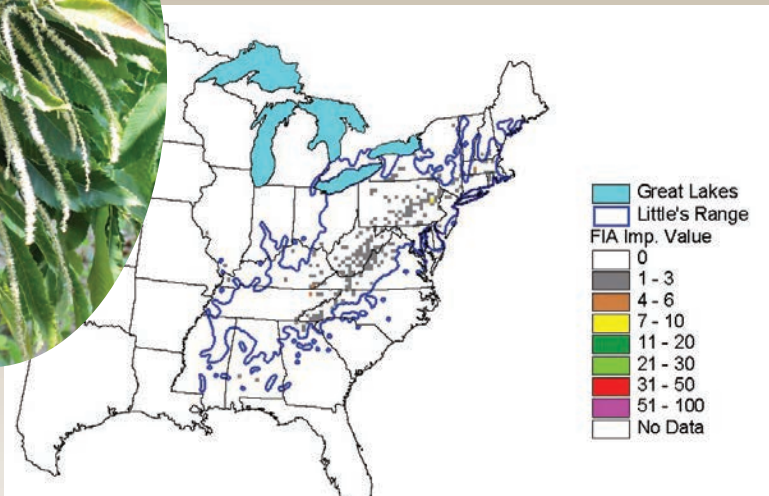
The American chestnut was also valuable for people. The nuts were prized as food and were an important cash crop for rural families. Nuts were sent to major cities to be roasted and sold by street vendors. The wood was straight-grained, easy to work, and rot-resistant. Some of its uses included utility poles, railroad ties, shingles, paneling, building material, fencing, ship masts, coffins, furniture, musical instruments, pulp, plywood, and firewood. It was high in tannin, which was used in the leather industry for tanning.

Two exotic fungi greatly impacted the ecological function of the American chestnut. As early as 1824, chestnut trees were reported to be dying from root rot fungus. Root rot nearly eliminated chestnut from some of the southern part of its native range from 1824 to 1870, especially from low-lying areas and poorly drained areas. An even greater impact was first noticed in 1904 when a forester reported an unknown fungus killing chestnuts at the New York Zoological Park. This fungus was chestnut blight. It rapidly spread throughout the native range of the American chestnut and by 1950 most American chestnut trees had perished. Some estimate that 4 billion trees perished. Possibly the greatest ecological disaster of all time had occurred. Many trees that are not impacted by root rot continue to sprout from the root collar of dead trees. The magnificent

American chestnut has been reduced to a subcanopy species and no longer performs its historic ecological role as a dominant canopy species.

The American Chestnut Foundation (TACF) is committed to restoring the American chestnut tree to our eastern woodlands to benefit our environment, our wildlife, and our society. This will involve the interaction of ecology, technology, and society. Restoration of the American chestnut is more than restoring a single species, it is restoring the ecosystems of which it was a part. It will increase our knowledge of how to restore other species. Restoration of the American chestnut will not happen as quickly as we had originally hoped. The backcross breeding program was based on the premise that blight tolerance from Chinese chestnut is controlled by a few genes with major effect. Thus, it should be possible to dilute out all genes from Chinese chestnut except for those involved in blight tolerance and through repeated backcrossing of Chinese x American chestnut hybrids to American chestnut. The American Chestnut Foundation recently tested this premise by genotyping many advanced generation backcross hybrids. They found that there is a tradeoff between blight tolerance the proportion of hybrid genomes inherited from

American chestnut. In other words, hybrid trees that more closely resembled American chestnut, were less blight tolerant. This result suggests that genetic control of blight tolerance is more complex than previously assumed. The American Chestnut Foundation plans to complete selection of the most blight-tolerant trees in the current backcross seed orchards. Selected trees are expected to



The American chestnut (upper left) was once a dominant tree in the eastern U.S. The blue outline on the map shows the historic range of the American chestnut. The dots within the range reflect the importance value of the tree in an area. The importance value is based on the number of stems and basal area of understory and overstory trees using forest inventory data from more than 100,000 plots in the eastern United States. The importance value ranges from 0 to 100 and gives a measure of the abundance of the species.

have intermediate blight tolerance and will be planted in restoration trials to determine if this level of resistance is enough for the trees to reproduce on their own in the forest. In addition, TACF is pursuing multiple alternative strategies to develop blight-tolerant populations. First, they are advancing additional backcross lines from additional Chinese chestnut parents through fewer backcross generations to American chestnut. These new backcross lines will be less “American” on average but will have greater blight tolerance. They aim to find the optimal balance between blight tolerance and American chestnut traits. Second, they plan to outcross transgenic American chestnuts containing a wheat gene to a diverse collection of wild American chestnut trees. These transgenic trees were developed by professors William Powell and Charles Maynard at the State University of New York. Federal review of transgenic American chestnut is ongoing and a decision about whether these trees may be distributed to the public is expected in the next few years. Trees from early outcross generations would be available almost immediately after federal approval; however, they estimate that three additional outcross generations will be required to dilute out the transgenic founder genome and incorporate enough genetic diversity for regional adaptation. Third, TACF is pursuing genomics research to identify genetic variants that underlie blight tolerance in Chinese chestnut. This work may enable future work to edit the genome of American chestnut to enhance blight tolerance. With all these approaches applied in parallel and possibly in combination, TACF remains optimistic about the prospect for large-scale restoration with blight-tolerant American chestnuts.

The Kentucky Chapter of TACF (KYTACF) continues to work with TACF on its breeding program with tremendous assistance from volunteers. We plan to expand our effort to help preserve the regional diversity of the American chestnut throughout its original range. Each tree has a genetic makeup that evolved to enhance its survival. From flowering early in the South to cold-weather resistance in the North, each region is unique. Preserving the genetic material of the American chestnut is crucial to TACF’s effort to breed a blight-



Scott Freidhof, Kentucky Department of Fish and Wildlife Resources, clips male flowers away from the female flower (upper left) while Kenny Pyles, Kentucky Division of Forestry, bags female flowers after they have been pollinated.

resistant tree and to increase the “adaptive capacity” of the American chestnut so it will someday have the “ecological resilience” to once again return to its historic ecological role in Kentucky’s forest.

In furtherance of the TACF mission, KYTACF will

continue to assist with the TACF breeding program, is increasing outreach, and is increasing its effort to establish in situ and/or ex situ Genetic Conservation Orchards (GCOs) in each of the four ecoregions in Kentucky where chestnuts were common prior to the blight. GCOs will help conserve the genetic diversity of Kentucky chestnuts, increase capacity to provide pure American chestnut seeds for constituents, provide pure American seeds for silvicultural research, and enhance breeding to incorporate Kentucky genotypes into genetically resistant trees.

How can you help? You can become a KYTACF volunteer. Examples of ways volunteers help include but are not limited to orchard maintenance, pollination, outreach, and helping locate wild American chestnut trees. We need a lot of help in locating surviving pure American chestnut trees for in situ and ex situ conservation orchards and for mapping surviving trees. If you would like to help with this effort, we can teach you how to identify American chestnuts and how to use Tree Snap to record data. If you want to be involved in searching for trees you may contact Rex Mann at 859.771.3477 or rexmann@gmail.com. If you think you have found an American chestnut, you can send a close-up picture of a leaf to Lynn.Garrison@earthlink.net or text to Lynn Garrison at 502.655.0538. If you want to be involved in other volunteer work, you may contact Ricky Caldwell at 502.807.2257 or rcaldwell@bernheim.org.

We are hopeful that someday the American chestnut will once again be a major part of Kentucky’s forest landscape.

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The Kentucky Chapter of TACF is looking for surviving American chestnuts across the state. The American chestnut tree in this image was recently found on a farm in central Kentucky. If you think you have an American chestnut on your property contact Lynn Garrison at 502.655.5038 or lynn.garrison@earthlink.net.



What's New for KWM? Kentucky Division of Forestry's (KDF) Corner

by Pam Snyder

Professionally speaking, there is always something exciting about being a co-editor of the Kentucky Woodlands Magazine. Whether it is writing an article myself, proofreading other professional colleagues' articles or reviewing the layout content. A lot of time goes into the production of the magazine because of the need for forest management statewide. Our small group sat down to talk about this issue and its content and the Kentucky Division of Forestry (KDF) was offered a page within the magazine to highlight the division's accomplishments and activities. The new section will be called the KDF Corner. The re-opening of a Division of Forestry office in Pineville, Kentucky is the focus of the first KDF Corner.

The Pineville KDF office had been closed due to a reorganization in 2013. The Kentucky Division of Forestry went through a second reorganizational process early in November 2018. During the second reorganizational process, the Southeast (SE) regional office in Hazard, Kentucky, was divided into two new geographical areas. This was due to the SE regional office having one of the state's heaviest wildland fire loads. The management decision was made to locate the new branch offices in Hazard and Pineville. This reduced response times to fires and has employees more strategically located in Eastern Kentucky counties. Officially, the Bert T. Combs building was re-opened on January 1, 2019. The Bert T. Combs building has significant history for the division and Pine Mountain State Park. This building was built in 1958 and was named after Kentucky's 50th governor. It was not the easiest task to re-open a building that had been sitting empty and idle for over five years.

According to Deano Carmicle, the regional environmental control manager:

- The first task was pressure washing the inside and outside of the building.
- The second task was replacing the heating and air conditioning unit.



Bert T. Combs

- The third task was getting new infrastructure like phone and computer lines installed by the Kentucky Commonwealth Office of Technology.

Currently, this facility houses:

- 1 regional environmental control manager
- 2 environmental control supervisors
- 2 foresters
- 6 rangers

KDF is proud to once again have the Bert T. Combs building open and assisting the citizens of the Commonwealth of Kentucky. This KDF office serves a ten-county area (Rockcastle, Jackson, Owsley, Laurel, Clay, McCreary, Whitley, Knox, Bell, and Harlan). Thanks again to all division staff who assisted with getting this office back in operation.

About the Author:

Pam Snyder, is the Forest Management Chief with the Kentucky Division of Forestry and works on a variety of forest management needs for private landowners, farmers, and governmental agencies. She is one of the editors of the Kentucky Woodlands Magazine.

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The mission of the Kentucky Division of Forestry (KDF) is "to protect, conserve and enhance the forest resources of the Commonwealth through a public informed of the environmental, social, and economic importance of these resources." As a means of meeting this mission, the division offers a variety of programs and services ranging from landowner assistance and master logger training to forest health protection and wildland-fire management. The division is also involved in the operation of tree seedling nurseries, urban and community forestry assistance, forest resource utilization and forestry education. The division operates six branch offices across the state. <https://eec.ky.gov/Natural-Resources/Forestry/Pages/default.aspx>

Growth and Development of the White Oak Initiative

by Darren Morris and Jeff Stringer

As the White Oak Initiative continues to develop and grow so does the excitement and expectations of what the Initiative can accomplish. One important goal of the White Oak Initiative is to provide knowledge, guidelines, tools, and information to forest landowners, managers, industry, stakeholders, and states that will ensure sustainable growth of white oak forests for decades to come. One of the first steps was the development of a \$2.3 million project involving 17 states and spearheaded by the American Forest Foundation and University of Kentucky and funded through the Landscape Scale Restoration program run by the USDA Forest Service. The goal is to improve white oak friendly forest practices across the region. This project has several components including a region-wide conservation plan for white oak, development of a set of technical guidelines and training on white oak regeneration and growth, development of landowner materials on white oak, demonstration areas, and web and social media platforms for landowners involved in growing white oak. The project recognizes that white oak does not grow alone, but thrives in a community with other upland oaks and associated species. As a first step in this project the 17 states are helping to determine the upland oaks that occur with white oak and that will necessarily benefit from management focused on white oak. It will be important to provide forest landowners with information on how to identify not only white oak seedlings in their forests, but also other desirable oak seedlings that may be sharing the same space. Materials on silvicultural methods and practices will be provided to the states and delivered to landowners, foresters, and managers. These practices will be assembled and developed with the assistance of oak researchers at universities and the US Forest Service. The complete set of silvicultural guidelines developed through years of research and encompassing the span of 17 states involved in the White Oak Initiative is the first of this magnitude, and will be necessary for the success of white oak (upland oak) forest management. Foresters, managers, and landowners will receive the same set of unified white oak management practices, guidelines, tools, and resources. As the White Oak Initiative progresses, the silvicultural guidelines will be developed into landowner-friendly informational guides. Web resources will be created. Organized technical

trainings for foresters and managers will be provided and carried out throughout the 17 states involved in the project. Demonstration areas will be created on both private and public forests in order to showcase the results of properly applied white oak silvicultural practices. Demonstration areas will ultimately offer visual proof that the practices, guidelines, tools, and techniques provided by the White Oak Initiative can successfully produce white oak (upland oak) forests that meet our management goals for decades to come.

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About the White Oak Initiative

The White Oak Initiative evolved from a partnership among forest and distilling industries, consultants, universities, agencies, and non-profits focused on the sustainability of white oak resources in the United States. The Initiative was born from the industries' interest in white oak and the recognition that work is needed to ensure the long-term availability of white oak timber. The Initiative is still in its infancy with interested partners actively working to build the foundations for a strong and vibrant enterprise. Initial funding has been provided by private industry and the American Forest Foundation and University of Kentucky, Department of Forestry and Natural Resources have provided personnel who are facilitating the collaboration of over 20 key partners throughout the white oak sourcing region to launch the Initiative. Initial steps include the development of a website and communications that will be open to all who want to be involved and the procurement of grant funding to facilitate white oak management.



Frontier News



by Kimberly Bonaccorso, US Forest Service Public Affairs Specialist

Your Daniel Boone National Forest

If you ask Forest Supervisor Dan Olsen what Kentucky's greatest treasure is, he will most assuredly tell you that it's the Daniel Boone National Forest (DBNF). With an abundance of natural resources and more than a million visitors each year, he makes a strong case.

The DBNF extends along the Appalachian foothills across 21 counties of Eastern Kentucky, making it the largest federally managed area within the state. These public lands support local communities through recreational tourism, sustainable timber supplies, clean water, energy and minerals, and wildlife.



In states that have national forest lands, federal payments are made that help support schools, road maintenance, stewardship projects, and county governments. The investments in infrastructure, ecosystem restoration, forest health, and salaries further support local jobs and income.

Providing Outdoor Recreation

Kentucky's national forest lands are characterized by steep forested slopes, sandstone cliffs, and narrow ravines. For those who come here, the rugged terrain is part of the attraction. Hikers and campers enjoy the quest for adventure, while nature lovers relish the scenic beauty and solitude.

Nearly 100 developed recreation areas and 600 miles of trail, including the Sheltowee Trace National Recreation Trail, are managed as part of the national forest. Cave Run Lake, Laurel River Lake, and the Red River Gorge are among the most popular areas. According to 2017 survey data, the majority of



Mountain forest view in Red River Gorge.

forest visitors are hikers. The viewing of natural features comes in second as a main activity, followed by fishing and boating. DBNF visitors spend an estimated \$49 million annually, an economic benefit that's especially important for the small, rural communities that occur in or near national forest lands.

Managing Natural Resources

Wood, water, and wildlife are the foundational resources that create a healthy forest, and the DBNF has a bountiful supply of these renewable assets. Currently, more than sixty percent of total forest acres is 80 years old or more, reaching its peak as a prime timber source. White oak is among one of the most sought-after woods, and the DBNF happens to be one of the most white oak-dominated forests in the country, a major perk for Kentucky's bourbon industry that uses white-oak barrels to age the distilled spirit.

Foresters, biologists, and fire-management specialists work together to promote forest health and reduce the risks of destructive pathogens and non-native invasive species. Prescribed fire, thinning, and midstory removal are a few of the management tools used to manage and protect our forest resources.

Portions of three major watersheds occur within the national forest boundaries. The Licking, Kentucky, and Upper Cumberland rivers flow through the forest, providing surface and groundwater resources for more than a million people.

The DBNF has five wildlife-management areas and two federally designated wilderness areas—Clifty Wilderness and Beaver Creek Wilderness. With more than 88,000 acres combined, these areas provide important habitat for an array of plants and animals, along with significant opportunities for biological research and education. The DBNF is also home to Kentucky's only federally designated Wild and Scenic River, the Red River.

Protecting Culture and Heritage

In addition to providing our most basic needs, the land is inherent to our cultural sense of place. Our national forest lands preserve remnants of our history and connect us to our ancestors. As citizens, these lands belong to all of us, and we all benefit from the resources that these lands provide. In the sense of greatest treasure, Olsen is apparently on to something. The DBNF is certainly among our nation's greatest treasures, and Kentucky is richer for having it.

More About The Forest:

The Daniel Boone National Forest is among 154 national forests and 20 grasslands managed by the Forest Service under the U.S. Department of Agriculture. The agency's mission is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. Visit the DBNF website at <https://www.fs.usda.gov/dbnf/>

FORESTRY 101



Planting Trees

by Laurie Taylor Thomas

A tree planting can range from a small planting of a couple of trees in your landscape to a large afforestation effort to establish tree cover on a non-forested area such as an old fescue field or former crop land. This article focuses on many of the components of planting trees in open areas such as former agricultural fields. It's important to determine your planting objective because it will often dictate the tree species and quantity of seedlings you will need. Two organizations that can be helpful in your tree-planting project and should be contacted prior to planning and planting are the Kentucky Division of Forestry (KDF) and USDA Natural Resource Conservation Service (NRCS). Both organizations can provide technical assistance with tree-planting projects, and NRCS may also be able to provide financial assistance for your project. With some careful and well thought out planning your tree planting can be successful.

Evaluating the Planting Site

The first step is to evaluate the planting site. This is important to help you match the right tree to the right site. Start this process about a year before planting since there are several factors you will need to know about your site. These factors include:

- Soil information such as type (drainage, fertility, and texture), pH, and moisture
- Amount of available sunlight
- Existing plant competition
- Site exposure (aspect or orientation if on a slope; north and east facing slopes generally have better growing conditions)
- Overhead or underground utility lines
- Nearby buildings, driveways, or sidewalks

Primary factors limiting tree planting success:

- Soil drainage: excessively drained or poorly drained
- Existing competing vegetation (grasses, weeds, and invasive plants)
- Exposure/aspect: wind, sun, and shade
- Wildlife: deer, voles, and other small mammals

For soil type information, visit your local conservation district and consult the U.S. Department of Agriculture's soil survey maps or visit the Natural Resources Conservation Service's Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>). To determine soil fertility and pH analysis submit a soil sample to your local cooperative extension office, check with them for the proper steps to follow when collecting the soil sample.

Selecting Tree Species

After determining your objectives for planting and evaluating your site, carefully consider the tree species you plant. The goal is to plant the right tree in the right place; select species with requirements that are similar to your site's conditions. It is best to choose trees native to the area. Only consider species that have no major pest or pathogen problems. Choose a variety of tree species so your overall planting will be less impacted if pest or pathogens issues arise. If you need assistance with selecting species for your planting site, consult with KDF, USDA NRCS, a local arborist, or your local cooperative extension office. You can also refer to KDF's Seedlings fact sheets (<https://eec.ky.gov/Natural-Resources/Forestry/state-nuseries-and-tree-seedlings/Pages/Seedling-Descriptions-and-Fact-Sheets.aspx>).



The Kentucky Division of Forestry can assist you in selecting appropriate trees for your tree planting project.

Tree Spacing and Arrangement

For a larger afforestation planting of deciduous trees for timber production, a closer spacing is desired to promote straight trunks and self-pruning branches. Knowing tree spacing and arrangement will help determine the number of tree seedlings to purchase. Site conditions will probably vary throughout the site, make sure to match the right species with those conditions. For example, if a portion of the site has wetter soils or is near a water source, you would want to plant a tree that is

tolerant of wetter soils. KDF can be of assistance with tree spacing and arrangement. Typical spacing for deciduous trees is either 8' x 8' or 9' x 9'. With 8' x 8' spacing you will need 681 trees per acre, with the 9' x 9' spacing you will need 538 trees per acre.

Landscape Plantings:

For landscape plantings, follow the U.S. Forest Service Guidelines for planting near sidewalks, driveways, buildings, and overhead utility lines.

- Trees should be placed at least 25 feet from overhead wires if a tree will grow larger than 30 feet.
- Trees should be placed at least 3 feet from pavement or fencing on all sides, 15 feet from buildings and other yard trees.

For landscape plantings you may choose to plant a containerized seedling or a "balled and burlapped" (B & B) tree that has a developed root ball with soil. B & B trees are more difficult to handle and to plant plus more expensive than containerized trees. Containerized and B & B trees can be purchased from a local nursery. To find a nursery in Kentucky, check-out PlantNative http://www.plantnative.org/nd_kytomt.htm. Be sure to keep tree roots moist until planting.

Ordering Trees and Tree Seedlings

The next step in your planting process is to order your plant material. For larger-scale tree plantings, you will likely choose bare-root tree seedlings. Bare-root seedlings generally come in bundles of 25 up to 100 seedlings. For bare-root seedlings, the KDF has two tree nurseries (<https://eec.ky.gov/Natural-Resources/Forestry/state-nurseries-and-tree-seedlings/Pages/default.aspx>) that provide dozens of



Tree seedlings may be purchased through one of the KDF state tree nurseries such as the Morgan County Tree Nursery (left) or the John P. Rhody Nursery in Marshall County. Seedlings are packaged and shipped in bundles of up to 100.



Photos pages 6-7 courtesy: Kentucky Division of Forestry

species in several bundle sizes. KDF Nurseries begin taking orders in September for the following spring plantings. The seedlings will be shipped to you from January to April. Seedlings should be kept cool and moist until planting so try to plant soon after receiving them.

When to Plant

The best time to plant is while the tree and bare-root seedling is dormant (buds have not opened) and the soil is workable; which in Kentucky means planting in the fall (late October through early December) or early spring (February through early April). Fall planting can allow roots to become better established over winter, however, if the winter is particularly cold and without snow cover, newly planted trees can be pushed out of the ground by frost-heave. For landscape plantings, place wood chips or mulch around the base of the tree to help reduce the possibility of frost-heave. Bare-root seedlings are typically planted in the early spring while they are still dormant.

Preparing the Site

Most afforestation efforts occur on former pastures or cropland, so these sites will need to be prepared for planting. The most ideal site would have had crops less than a year ago so they will be relatively free of weeds and woody stems. Tree seedlings could be planted right away once crops are removed. However, if there are weeds, woody shrubs or trees they will need to be removed and controlled prior to planting; this may require the use of herbicides. Work with your forester to come up with the best plan of removal and control. Also, remember if using herbicides to review the herbicide label that provides information on when to use and how to be safe during application and disposal.

Mechanical and Hand Tree Planting

For afforestation projects where the landscape is not too steep and the site is accessible, the quickest and easiest method for planting seedlings of 1,000 or more is using a tree setter attached to a tractor. Contact KDF for information on how to borrow and use this machinery. However, if your site is too steep, you are planting less than 1,000 seedlings, or the expense of renting machinery is too great, your option is to plant the seedlings by hand. To plant by hand you will need a dibble bar, grub hoe, planting bar, or any other flat-bladed tool. The blade size needs to be large enough to make a proper size hole for the roots of your tree seedlings (see infographic on page 8). Once the seedlings are planted, you may need to consider protection from wind, wildlife damage, and



For larger plantings where the land is not too steep, tree setting machines can be borrowed from KDF.



Rigid seedling protector.

mowers. Depending on your site and budget, seedling protector tubes may be an option. Seedling protectors can be expensive, therefore cost prohibitive, on a large planting, but for smaller plantings they can be beneficial to the survival of the seedlings. Periodically check the seedling protectors and replace as necessary. Also remember you will have to control competition from weeds, and this may require the use of herbicides or mulch, depending on the plan you have developed with your forester. For more information on tree protection see Kentucky Woodlands Magazine Volume 6 Issue 2, Forestry 101 by Dr. Jeff Stringer.

This article highlighted a few of the important steps of proper preparation and planting of trees and tree seedlings, but it is highly recommended that you contact a professional forester or local cooperative extension office for advice and assistance with your tree-planting project.

Resources:

Kentucky Division of Forestry Tree seedling planting instructions: <https://eec.ky.gov/Natural-Resources/Forestry/Documents/seedlingplantinginstructions.pdf>

Kentucky Division of Forestry Forest Stewardship Program and Landowner Services: <https://eec.ky.gov/Natural-Resources/Forestry/forest-stewardship-program-and-landowner-services/Pages/default.aspx>

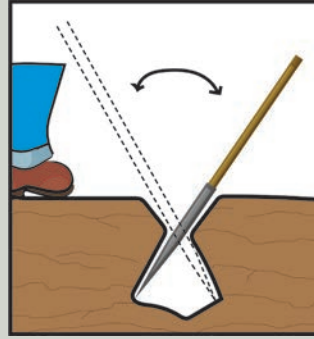
Cost-share options for Kentucky forest land owners: <https://eec.ky.gov/Natural-Resources/Forestry/forest-stewardship-program-and-landowner-services/Pages/Cost-Share-Options-for-Forest-Landowners.aspx>

Forestry Suppliers equipment (tree planting bar and tree seedling protection tubes): www.forestry-suppliers.com/

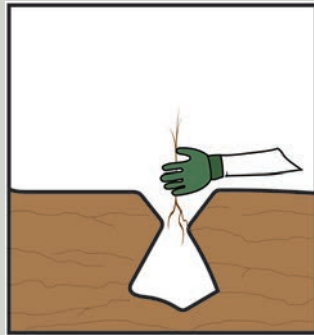
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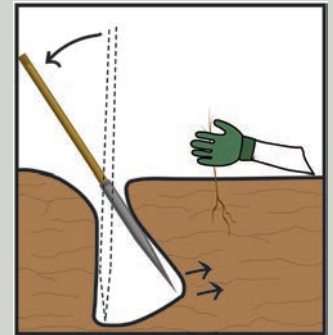
Hand Planting Tree Seedlings



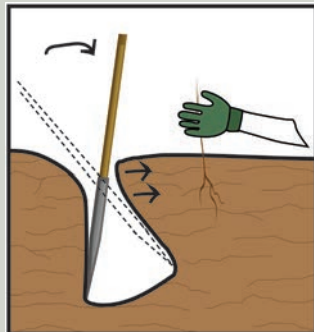
(1) Insert the dibble bar or other tool straight into the ground, pull backward on the handle and push forward to make a small hole.



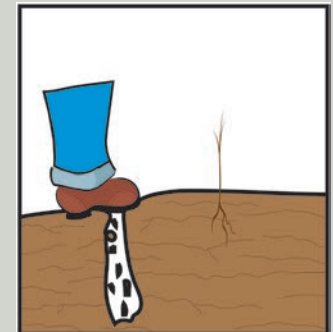
(2) Remove the dibble bar and push the seedling into the hole. Shake the roots free and pull the seedling back up to where the root collar is at ground line.



(3) Move six inches back and insert the tool straight into the ground again and pull the bar handle toward yourself firming up the soil at the bottom of the roots.



(4) Push the handle away to firm up the soil at the top of the roots.



(5) When the hole of the seedling is closed, fill in the last hole by tamping it with your heel.

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Wildlife 101

Selecting, Managing, and Planting Trees for Wildlife

by Matthew T. Springer

There are many reasons a landowner can have for managing their forest. Wildlife frequently comes up close to or at the top of that list. We have previously discussed the importance and advantages of having both a forest-management plan and a wildlife-management plan, regardless of your personal goals for your property. To build on that knowledge, or to better understand the wildlife management plan that may be presented to you, let's talk a bit about what trees are beneficial to wildlife and how that may vary by species. Understanding what each species or genus of tree brings to the table for wildlife, both figuratively and literally sometimes, may aid you in comprehending your property's plan, or allow you to do some small-scale management to benefit wildlife on your own.

Wildlife and Trees

Trees provide wildlife many attributes that help them survive. These attributes can include but are not limited to, cover from predators, thermal cover during poor weather, food in the form of mast, vegetation, or the insects that live on them, or nesting habitat for a bird or squirrel on a branch or in a cavity. Many of our tree species provide multiple of these attributes, but we know for certain that trees are vital for the survival of hundreds of the wildlife species that call Kentucky their home.



White-tailed deer rely heavily on mast produced by many Kentucky tree species.

All photos courtesy: Thomas Barnes

Beneficial Trees for Wildlife by Groups of Species

Song Birds

The direct benefit for all bird species is the cover and nesting benefit. Trees provide both from the time they are saplings until they have reached maturity. What is a little more complicated is how trees provide food. There are two manners in which trees provide song birds food. First and most directly, they produce mast and seeds. Second, they are host plants for lepidoptera species—in bird terms, delicious high protein caterpillars. Eastern redcedars offer wonderful cover from predators and thermal cover in winter when found in thick stands, and their berries offer an ample food supply. Serviceberry is an excellent tree to plant for song birds as its substantial production of berries usually are consumed as soon as they are available by many bird species. Dogwood species and sumacs offer wonderful food and cover for many bird species.

For many of our birds such as our warbler species, they are not keying in on the seeds or mast produced as much as the insects that live on the plants. Species of oak, hickory, and beech are known to host large diversities of lepidoterans, otherwise known as caterpillars, throughout the summer breeding season helping to provide food for their young. Other arthropod species, such as beetles and flies, also key in on these genera of trees providing an additional food source.



A forest stand with a diverse group of plant species will provide ample food for invertebrates like caterpillars which in turn feeds birds and small mammals.

Overall, a diversity of tree species within a stand can also help provide the diversity of insects who live on the plants, which translates into a buffet of food for the birds. So really the best advice for song-bird management is keep as many native species around as possible, because that means more bugs, berries, and seeds for them to consume.

Deer, Elk, Bears and Other Animals with Fur

Mast is the name of the game here. Remember that these wildlife species are going to consume both hard and soft mast during the year along with some browsing of branches by our deer and elk throughout the year. New growth is especially nutritious and will be favored, therefore any management that increases forest



Many of our wildlife rely heavily on hard mast to make it through tough winter months.

regeneration will succeed in providing those conditions. Older stands that include a substantial number of oak and hickory species are especially important to this wildlife group as acorns are highly desired and play vital roles in fattening them up prior to the lean times of winter. Other species of tree that still can offer a vital role in the survival of wildlife include hawthorns, whose fruit are eaten by squirrels, deer, foxes, and rabbits. Dogwoods, sassafras, mulberry, and persimmon also support a wide variety of wildlife, from beavers to groundhogs. Even our Kentucky coffeetree fruits are favored by squirrels, opossum, raccoons as well as song birds.

Turkey, Ducks, Quail, and Grouse

These species of wildlife are going to key in on two main services trees provide, food and cover. For the food aspect, samaras from the maple species are consumed by many game bird species. Ash trees and tulip poplar seeds also offer value to turkey and quail. Pin oaks are a great species to promote or plant in areas with turkeys or ducks, as they are especially a favorite item for wood ducks who will walk into the forest to gobble them down when they are not falling into the ponds and sloughs they inhabit. Black cherry is one that



Grouse was once a common bird in Kentucky but due to the loss of young forest stands their numbers have dwindled.

can benefit grouse in particular, as their buds are a good food source.

In terms of cover, these species are looking for age classes of stands more than anything else. Turkeys will look for a mix of very early successional habitat to mature oak and pine stands. Ducks will use areas that are flooded by nature, but will choose to roost in ponds protected from the elements with thick trees that provide cover from predators. Quail will look to use the edges of woods with young age classes, especially during winter when the fields they usually inhabit may not provide the cover from predators they do in the spring and summer. Grouse especially will key in on stands that are about 5-15 years old for both food and cover.



Turkeys rely on trees for roosting habitat as well as the mast produced by them. Up to 50% of their winter diet can be acorns from the fall mast crop.

Planting Trees

Many times when we are trying to improve our property in the forestry world, we are not thinking about planting trees but are thinking of managing the trees we already have. In certain cases with wildlife we may be trying to supplement certain aspects of a survival requirement for a certain species. In this situation we generally know what species we are managing for, what they need to survive, and how tree selection can aid in their success. The situation that arises then becomes site selection of the trees you want to plant. In the Forestry 101 article just before this one, the basics of tree planting and how site selection is a major component to the success of a planting was discussed. Tree planting is usually a straightforward task but sometimes it can get more complicated if you have multiple types of tree stand age classes present, areas of forest edges, or large stands of mature trees with little opportunities to plant other than in shaded locations. For instance, say we want to plant more

soft mast species and we select persimmons and plum to enhance food abundance for almost all the wildlife species on the property. These are wonderful tree species for wildlife, but they really need to be planted on the edge of a forest, not somewhere they have to compete for light. So the main

message here is that a little thought is needed for both what trees you need to help your wildlife and where it needs to be planted to help the trees thrive and therefore provide all the wildlife benefits for which you hoped.

Managing Forests for Wildlife Trees

Promoting certain tree species does not require you to plant them. If you already have a wildlife management plan for your forest, it should include one or multiple forestry management prescriptions to benefit wildlife. Some of these prescriptions may be straightforward. For instance, having a patch-cut harvest within your forest will allow you to potentially generate income off of your trees, but it also will offer a new age class of forest within your property that favors soft mast producing species and substantial amounts of cover and nesting habitat for many of our wildlife species. One that is less obvious may be a crop-tree release. This is a common tool used to allow the growth of individual trees for particular objectives, such as favoring trees with more income potential within a forestry prescription. We can use the same tool to help “enhance” our wildlife friendly trees.

Releasing maturing or mature white oaks or other mast trees should lessen the competition on it, hopefully allowing it more resources to produce more abundant mast crops in future years, increasing high value food for many species of wildlife.

Prescribed fire is another tool that is becoming more readily used across the country and within Kentucky to help enhance wildlife habitat in both fields and forests. The idea is that oaks are more fire tolerant and species such as maple and beech are not able to survive a fire disturbance, especially when they are younger. There is some evidence that supports this, however the results that fire favors oaks is not as clear as we once thought or hoped. The overall wildlife-management idea is that oaks are a much more valuable wildlife tree than maple or beech. Thus, any way we can increase the presence of oaks in a forest that is seeing increasing rates of maple and beech composition within stands is a good thing. Caution needs to be warranted as anytime you use fire there are many potential problem areas and safety concerns. You should always use professional help when implementing this practice.

Take Home

Trees offer many benefits to wildlife and should be utilized to accomplish wildlife-management goals on your property. Even though wildlife-management goals will vary by the individual, the key elements that trees provide such as food, cover, and breeding habitat will hold true for all of them. Identifying your wildlife goals will help start the process for successfully using trees to meet those goals. As usual, don't forget to use the professional resources available to you through the Kentucky Division of Forestry, Kentucky Department of Fish and Wildlife Resources, county Extension office, or Natural Resource Conservation Service to help obtain your goals on your property.

About the Author:

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Many wildlife species also depend on soft mast like persimmons and these tree species should not be ignored when planting or managing to promote wildlife on your property.

Photo courtesy: Rebekah D. Wallace, University of Georgia, Bugwood.org

FIA and Why It's Important to Kentucky

by Pam Snyder

Foresters use a lot of acronyms to shorten the names of federal programs such as "FIA." It stands for "Forest Inventory and Analysis" a program that is sponsored and funded by the U.S. Forest Service and is the nation's continuous forest census. The FIA program traces its origin back to the McSweeney-McNary Forest Research Act of 1928. This law initiated the first forest inventories starting in 1930 in the United States. The FIA program shows forest trends that are likely to appear 10 to 50 years out and it assesses whether current forest-management practices are sustainable long term. The FIA program has changed dramatically over the decades from periodic to annual surveys to collecting data about forested area, location, species, size, tree health and tree growth, mortality, harvest removals, wood production, utilization, forest ownership, soil, understory vegetation, tree crown conditions, and coarse woody debris (<https://www.fia.fs.fed.us/>).

The U.S. Forest Service makes grant funds available to the

Kentucky is 48% forested, which roughly means it has 12.3 million acres of forestland.

Kentucky Division of Forestry in order to have FIA foresters on staff. These foresters have the duty and responsibility of measuring inventory plots across Kentucky, and they currently visit approximately 14-20% of the established plots on an annual basis. Kentucky has 4,304 permanently established plots across the state on a 6,000 acre grid system and 2,345 plots are forested. Each plot center is permanently marked with a metal pin. The crews utilize a metal detector to scan the ground and sometimes they find it occupied by other woodland animals. Currently, 62,887 non-forested acres revert to a forested condition annually. The FIA crews go places most Kentuckians can only imagine, and they have been to these inventory plots multiple times over the years and have many memories. The crews usually work in teams of two.



Above: FIA plots have more than just trees on them!

Left: Steven Rogers, FIA Forester, using a clinometer to measure tree height.

All photos courtesy: Steven and Tammy Rogers

One crew shared a recent story. While working in Warren County on a reverting non-forested plot that had a lot of blackberry briars with ripened berries and other young vegetation, one crew member accidentally kicked a log located near the briars. She picked some of the berries and noticed immediately a very bad aftertaste. As they continued to go about their work, the other crew member noticed a foul odor and they continued working the plot and got it completed. Realization set in: They had disturbed a skunk! Although the crew was not directly sprayed, their equipment, clothes, vehicle, and hotel rooms

had to be steam/deep cleaned. The final note from the crew and moral of the story was tomato juice does not work.

Prior to visiting a plot, a forester will contact the landowner

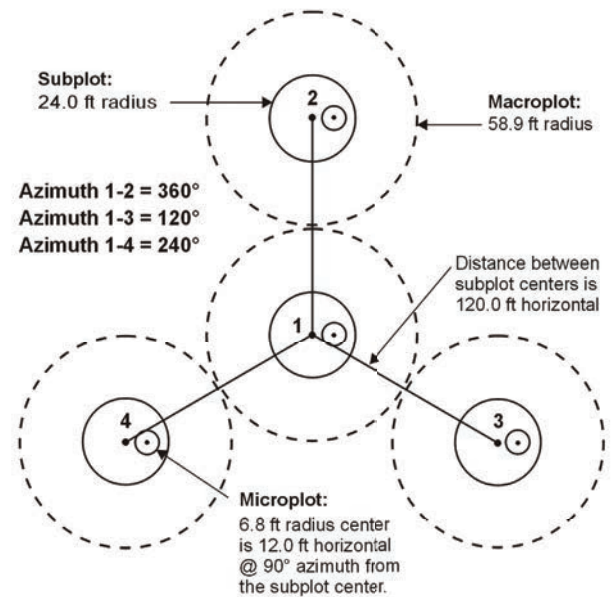


Figure 1. The forest inventory plots are designed to cover a 1-acre area. Plots contain numerous subplots and microplots.



Tammy Rogers, FIA Forester, uses a variety of equipment to measure and record forest inventory data.



to get permission to access the established plots on their property. The Phase 2 plots are designed to cover a 1-acre sample area in size and contain subplots and microplots (see figure 1). All the inventory plot data is recorded on electronic field recorders. The Forest Inventory Analysis data and tools are available online via the USDA Forest Service website (<https://www.fia.fs.fed.us/tools-data/index.php>). The FIA data is utilized by various programs: the National Woodland Owners Survey, National Timber Products Output Survey, Urban Forest Inventory, Logging and Fuelwood Production Survey, and others. The FIA data is crucial to providing inventory data that affects policy, forest management, and forest economic decisions at the state and national level.

In 2018, Kentucky's forestry sector employed more than 26,500 people directly and had a total economic contribution over \$13.5 billion dollars. So if you see individuals dressed in bright orange forestry cruising vests and hardhats on your property, send them a big thank you for playing a key role in helping the Commonwealth of Kentucky have updated forest-inventory data through the national USDA Forest Inventory and Analysis Program.

About the Author:

Pam Snyder, is the Forest Management Chief with the Kentucky Division of Forestry and works on a variety of forest management needs for private landowners, farmers, and governmental agencies. She is one of the editors of the Kentucky Woodlands Magazine.

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FOREST

What Drought Means for Trees

by Ellen Crocker and Bill Fountain

It is no secret that the 2019 summer was hot and dry. In fact, most of the state experienced a severe drought with extreme drought in some areas (see Figure 1). From landscape settings to woodlands, trees show signs of water stress, and we may be seeing the repercussions of this drought for years to come. What does this mean for your trees? It depends on their location, species, and overall health.

What are the signs of drought stress?

Different trees express water stress differently, but initial signs include reduced growth and wilting of leaves. Over time, leaves of some trees change color early (like red maple) while others may drop early (like yellow poplar)

or scorch brown from the tips in and die (like silver maple and deciduous magnolias) but are retained on the tree.

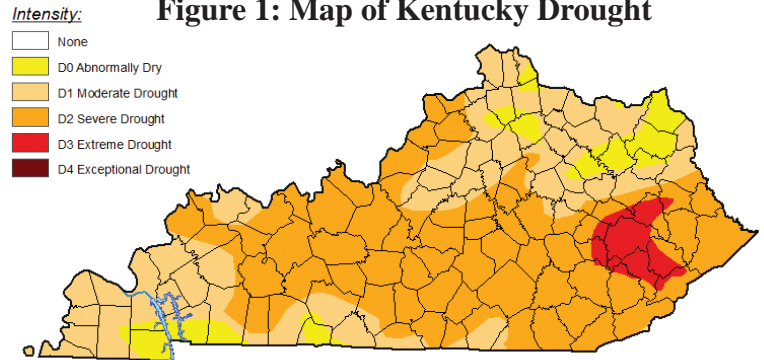
Drought symptoms tend to be most obvious and

severe in landscape settings but can have a big impact on forest trees as well. Trees that were recently transplanted and have not regenerated their root systems or are growing in poor, compacted soils are ill-equipped to deal with a shortage of water. However, trees in the landscape setting can (and should) be regularly watered in drought conditions, a luxury not available in woodlands.

How does drought affect trees?

A severe drought is a major stress on trees in a variety of ways. First, since trees lose their leaves (and some of their roots) they produce fewer resources to sustain themselves. A tree's growth may be stunted for several years following a severe drought as trees replenish their stored energy

Figure 1: Map of Kentucky Drought



Map courtesy: Brian Fuchs, National Drought Mitigation Center, October 2019

reserves. It is possible that this year's drought is especially challenging for trees as it comes after two years of record rain, during which trees may have added additional growth that they now cannot support.

In severe droughts, species often go dormant as if it were winter. The problem comes when the drought ends in early fall and the plants begin growing as if it were spring. This new growth (e.g. flush of shoots or leaves) is not likely to become dormant before the first frost or freeze. When this happens, we immediately see shoot death. The following spring, vertical cracks may develop in the bark. While not visible, drought can also cause the death of root hairs responsible for uptake of water and nutrients. A smaller, less-vigorous root system can result in less growth the following year and a longer recovery time.

As soil dries it is common for it to crack. This cracking can physically snap

roots effectively pruning an already stressed root system. In soils that have an especially high amount of clay, this can result in trees that become unstable and lead to whole-tree failure. When the drought is eventually broken, initial rainfall will run into



Drought symptoms can vary by tree species and overall health of the tree. This American beech exhibited early leaf color change.



When the ground cracks because of drought, tree roots can break or be destroyed.

Photos courtesy: Ellen Crocker



these large cracks and be drained away from the plant's absorbing roots, continuing the effect of the drought.

Stress resulting from drought can also trigger decline in a tree and increase its susceptibility to insects and diseases. Many issues opportunistically affect trees that are otherwise compromised, from hypoxylon canker to two-lined chestnut borer to ambrosia beetles. This drought could set the stage for tree death years from now from secondary issues that would have been minor had the tree been growing vigorously and able to defend itself.

Drought tolerance varies by species

Our native trees are adapted to deal with occasional extreme weather conditions, and many are relatively drought tolerant, including many oaks. On the other hand, some species, such as yellow poplar, beech, and sycamore, are less tolerant of drought. This summer could mean future problems, especially if they are growing off-site in areas drier than they normally do. In general, upland and early-colonizing tree species are more drought tolerant while bottomland and late-successional species are less tolerant, although there are many exceptions.

What does this drought mean for trees?

It is hard to predict the impact this drought will have on our forests and woodlands. Many of our native trees are adapted to occasional droughts and are likely to bounce back with little damage. For others, severe water stress can be the beginning of a long decline (or the nail in the coffin if trees are already struggling). Supporting a diverse mixture of vigorously growing trees and management practices that promote healthy woodlands in general are likely to help trees recover from drought and other stressors.

Laurel Wilt Disease: A New Threat to Sassafras Trees

by *Ellen Crocker*

Laurel wilt is a new disease that is killing sassafras trees in southwestern Kentucky. Here's what you should know about it:

What's at risk?

- In Kentucky, sassafras trees are the species most at risk from laurel wilt. However, it affects all members of the Lauraceae family including spicebush. Potential hosts do not include mountain laurel, which, despite its name, is not in this family.

Symptoms

- Sudden wilt of leaves
- Rapid tree death with dead red-brown leaves still attached
- Sapwood with dark, systemic, streaky staining when bark is cut away

Laurel wilt is caused by the invasive fungal pathogen *Raffaelea lauricola*, which colonizes sapwood and travels through the xylem. The disease clogs the flow of water in the tree's trunk, resulting in the "wilt" symptoms similar to those of a tree without enough water. This effectively strangles the tree and rapidly kills it. The laurel wilt fungus is moved by the invasive redbay ambrosia beetle, *Xyleborus glabratus*. These small insects (approximately 1/16-inch long) bore into trees or shrubs, leaving a very small circular hole in the bark, accompanied by a thin "toothpick" of sawdust. These beetles carry fungal spores with them that can spread to new trees as the beetles tunnel under the bark. Not all ambrosia beetle damage on sassafras is related to laurel wilt, and laurel wilt can still be present even if there are no visible signs of ambrosia beetle. No management options are currently available for laurel wilt. But you can help to slow its spread by not moving wood products, such as firewood, from infected trees.

As this disease is new to Kentucky, efforts are ongoing to determine the extent to which it is present in the state. If you suspect laurel wilt, please contact a local county Extension agent for further assistance.

About the Authors:

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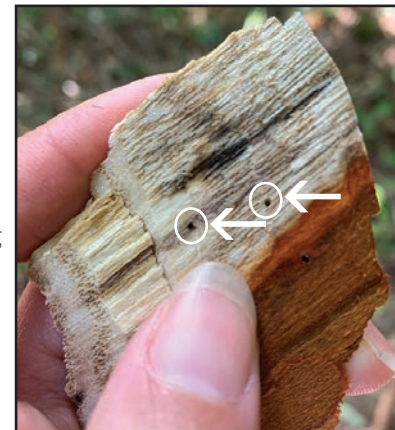
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Cutting away the bark of infected sassafras trees reveals dark streaky staining caused by laurel wilt.



Redbay ambrosia beetles, which spread the laurel wilt pathogen from tree to tree, are tiny and leave very small exit holes in the bark of trees (arrows pointing to holes).

White Oak Genetics Project

by Laura DeWald

Acorns being hand planted at a Kentucky Division of Forestry nursery.

All photos courtesy: Laura DeWald

The White Oak Genetics Project (<https://white-oak-genetics.ca.uky.edu/>) is a collaborative effort to develop high-quality white oaks (*Quercus alba*) for reforestation throughout the Eastern United States. Development of improved white oak builds on existing white oak genetics research and supports the White Oak Initiative by setting up a program designed to answer a wide variety of white oak genetic variation questions associated with traits that have economic and ecological value. The improvement program also will provide a sustainable supply of high-quality white oak genetic material via acorns and seedlings.

Knowledge gained and material available from this improvement program will increase our ability to conserve and restore white oaks to achieve a variety of ecological, conservation, and economic goals at regional and national levels. To achieve these goals, white oak acorns will be collected from throughout its geographic range, the acorns will be grown in a nursery then planted into test plots to evaluate local adaptation, genetic diversity patterns, superiority in a variety of traits, and expression of specific DNA sequences. Selected trees will then be grown in seed orchards to provide acorns of improved white oak that will support ecological success in the forest and for traits that will provide increased economic value of wood products.

A critical first step in the White Oak Genetics Project is collecting acorns from as many trees as possible from all Eastern U.S. states and from all the different environmental regions within each state. This will ensure we have a broad sample of white oak genetic diversity from across the natural range of the species. If you see a beautiful white oak tree, we would love to have acorns from it. The White Oak Genetics Project needs acorns from single trees in multiple locations within each state. To work toward this goal, 345 collection kits were sent out in September 2019 to volunteers searching for trees dropping enough acorns to fill a one-gallon bag. So far, more than 100 kits have been returned and more than

14,400 acorns from Arkansas, Georgia, Kentucky, Maryland, Missouri, North Carolina, Tennessee, and Virginia have been planted in the Kentucky Division of Forestry's Morgan County nursery in West Liberty, KY. This number will increase as additional collections are still being received. Collecting efforts will continue in 2020 and in 2021.



Acorns collected near Asheville, NC were sent to the White Oak Genetics program.

How you can get involved in the White Oak Genetics Project over the next several years:

- Volunteer to collect white oak acorns from across the geographic range where the species naturally occurs.
- Volunteer to collect scion material from some of the parent trees whose acorns were collected to be used to create grafted seed orchards.
- Allow the planting of white oak seedlings on your property to evaluate which parent trees produce high-quality seedlings and which sources of white oak are best adapted to different areas.

Goals of the White Oak Genetics Project:

1. Provide a sustainable supply of high-quality white oak seedlings, which will improve our ability to conserve and restore white oaks to achieve a variety of ecological, conservation, and economic goals at regional and national levels.
2. Provide white oak genetic resources to academic and industrial research and development efforts.
3. Collect and archive white oak genetic material from throughout its range.
4. Establish a breeding program to meet current and future demands for white oak seedlings for reforestation.

About the Author:

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Kentucky Tree Farm Committee Newsletter

The Kentucky Tree Farm Committee is responsible for administering the Tree Farm program in Kentucky. One of the most difficult but enjoyable responsibilities of the committee is selecting the annual Tree Farmer and Logger of the year award winners. Read on to learn about the most recent Kentucky Tree Farm Committee award winners.

William & Chris Lagermann Named Kentucky Tree Farmer of the Year

William “Bill” & Chris Lagermann from Edmonton, Kentucky were honored as the 2018 Kentucky Tree Farmer of the Year. Mark Wiedewitsch & Tammy Rogers, with the Kentucky Division of Forestry nominated the Lagermanns. The Lagermanns were selected from a number of nominations submitted to the Kentucky Tree Farm Committee.



Ky Ag. Commissioner Ryan Quarles presents the Lagermann's a Stihl chainsaw donated by Bryan Equipment Sales. Tree Farm Chairman Doug McLaren presents a commemorative plaque.

Their 262-acre Tree Farm in Metcalfe County, Kentucky is managed for a wide range of benefits including timber production, wildlife and recreation. The farm has been certified as a Tree Farm since 2014 and has consistently improved the woodland through a number of active management practices. Improvements on the farm include a 31-acre redcedar harvest to encourage hardwood regeneration as well as 80 acres of timber stand improvement including 14 acres of invasive species control. Reforestation projects have focused on erosion control and trees for wildlife. There has also been work completed on miles of forest roads to maintain access for forest management, fire control and recreational purposes. The wide range of management activities have not only improved timber production but also resulted in better wildlife habitat, and recreational opportunities on the property. The Lagermanns are also a past winner of the Kentucky Outstanding Forest Steward Award. They take an active role in all forest management on the property and encourage others to practice good forest management. They are very active with a number of organizations that support forest management and conservation.

S & S Lumber Kentucky Logger of the Year

S & S Lumber/Spencer's Logging of Rogers, KY were honored as the 2018 Kentucky Logger of the Year. The Kentucky Division of Forestry Northeast Branch office nominated them. In addition to a plaque recognizing their achievement, a Stihl chainsaw sponsored by the Kentucky Tree Farm Committee was also presented to S & S Lumber. The company harvests timber for landowners throughout eastern Kentucky and was selected from candidates submitted from across the state.

Spencer's Logging consists of 6 employees and they regularly contact the Division of Forestry to inspect all of their active logging jobs. Four of the crew have been trained as Kentucky Master Loggers (KML) which is a training program for loggers to incorporate proper harvesting techniques, operate safely and use best management practices to protect water quality. Kentucky law currently requires a minimum of one trained KML on the logging site and in charge of the operation. Spencer's Logging operation is independently owned and has an excellent professional relationship with landowners and the forest industry. They have always been committed to serving the landowner and often increase property value by seeding and improving access roads after logging. The crew takes tremendous pride in protecting the trees that they leave after the harvest to sustain the forest resource for the future. The logging crew always makes sure that water quality is protected on the harvest site and that all water quality regulations are followed properly.



KY Forest Industries Executive Director, Bob Bauer presents a Stihl chainsaw donated by Bryan Equipment Sales to Spencer's Logging.

If you are interested in your property becoming a “Kentucky Tree Farm” ask your forester to nominate you or call 502.695.3979.





Kentucky
Woodland
Owners
Association

The Mystical Magical Language of Kentucky Woodland Management

by Doug McLaren, KWOA President

www.kwoa.net



Recently I had the pleasure to attend the Kentucky Association of Conservation Districts annual meeting in Lexington. The three-day event is always packed with topics and discussion that Kentucky soil conservation folks are eager to hear. The side-conversations often concern personal accounts of management endeavors on farms and helping in the management of soil “down on the farm.” A great deal of the conversation and programming centers around those individuals who manage row crops and cattle. Woodlands, even though it covers one half of the state and greatly reduces soil movement in the environment are not discussed at length. I have a suggestion as to why discussion outside the forest community does not take traction: terminology.

I do not farm either row crops or cattle, but I can sit in the conference sessions or over a cup of coffee and understand the important bottom-line concept—yields. It is rather simple. Good management of either row crops or cattle will produce high yields. These yields are measured in pounds or tons. Simple concept: Good management of soil and crops will yield good returns.

Now, let's discuss woodlands and their unique place in the conservation conversation. This is where I think things become confusing for those individuals who are not involved in a daily or annual investment in woodland management. As soon as a forester or one of our experienced Kentucky Woodland Owners Association members begin discussing the value of forest management, a non-experienced individual becomes less attentive. Those invested in woodland management start by discussing the number of board feet per acre or tree. We hold up our fingers to portray what a board foot looks like. We demonstrate this by placing our fingers in a way to describe an imaginary 12-inch by 12-inch square board. Then we have them visualize the third dimension of one inch in thickness. We continue this conversation by saying that we can only estimate the number of board feet in a tree. Your new recruit who is slowly understanding this lingo of woodland management says to you, “You can't find a device that gives exact values. Only estimates?”

Explaining board feet is only the beginning of the mystic parts of forestry. More in-depth mystics is when you talk to this individual and tell them that this magical number of board feet per tree, which is what determines the dollar value of the tree, is measured by a mystical instrument called a Biltmore stick. By using this stick, you can determine estimated diameter of a tree at DBH and the merchantable height of a tree. Again, all estimated. By now some confusion might be seen in the eyes of the person you are trying to convert to intensifying their woodland management efforts. The person in questions asks, “How do you get a measurement through a tree without chopping it down. Why not take the circumference that would not be estimated?” “And, what is a DBH?” This entire conversation of “estimations” is being told to someone who uses the weight of a truck before and after unloading to determine the exact value that can be then converted to dollars. Not an estimate.

Those of us who are deeply committed to woodland management across Kentucky appreciate, enjoy, and make profits from Kentucky woodlands. I have stated over the years that woodland management is much the same as farming, just stretched out over a longer period of time. We need to find a way to take the mystical magical confusion away from those wanting to incorporate woodland management into their overall farm plan. Simply put, we should stress that woodlands are a farm asset that can be more productive and profitable with sound woodland management, just like a herd of cattle or a field of corn.

Photo courtesy: Renee' Williams

For more information log on to www.kwoa.net



Kentucky Natural Resources Conservation Service

Supports Sustainable Forestry



by Michelle Banks Tice, Kentucky NRCS Public Affairs Specialist

The Kentucky Natural Resources Conservation Service (NRCS) administers numerous programs to help woodland owners implement conservation practices on their property. The Kentucky Forestland Initiative provides financial assistance through the Environmental Quality Incentives Program (EQIP) to help woodland owners achieve their property objectives, whether it is wildlife habitat, timber production, or economic sustainability. Regardless of your objectives it is important to have a written forest management plan. The plan outlines the strategy, documents goals for managing forest resources, and helps you keep track of achievements.

Decreasing Wait Times for Forest Management Plans

The University of Kentucky Department of Forestry and Natural Resources Cooperative Extension Service (UK FNR Extension) recently partnered with the Kentucky Division of Forestry and Kentucky NRCS. Together, these partners work to address the long wait times Kentucky woodland owners are experiencing to have a forester develop a forest management plan. Encouraging woodland owners to work with a professional forester to develop a forest-management plan is one of the more frequent recommendations UK FNR Extension makes to woodland owners. However, the long wait times for a woodland owner to work with a service provider creates an obstacle to the implementation of conservation practices. Based on feedback from these woodland owners, partners created a project to help woodland owners. Through NRCS's Regional Conservation Partnership Program and the Environmental Quality Incentives Program, a five-year project (approved in 2017) was developed to utilize close to \$300,000 in financial assistance for woodland owners to hire technical service providers to develop conservation plans for their woodlands. These providers expand the number and availability of conservation technical experts capable of offering customized, one-on-one conservation advice to landowners.

Through a new, standardized forest-management plan template, service providers can increase their efficiency, leading to shorter



Kentucky NRCS provides many programs to help woodland owners manage their woodlands.

Photo courtesy: Renee' Williams

wait times for landowners to address woodland resource concerns such as water and soil quality decline, forest health, air quality, threatened and endangered species, and invasive species. Counties included in this project are: Adair, Allen, Barren, Bath, Boyd, Breckenridge, Carter, Casey, Clinton, Cumberland, Edmonson, Elliott, Estill, Fleming, Grayson, Green, Greenup, Hardin, Hart, Johnson, Larue, Lawrence, Lewis, Lincoln, Magoffin, Marion, Martin, Mason, McCreary, Meade, Metcalfe, Monroe, Montgomery, Morgan, Powell, Pulaski, Rockcastle, Rowan, Russell, Simpson, Taylor, Warren, Wayne, and Wolfe. Interested woodland owners in these counties who have been waiting for a forest management plan should visit their local NRCS office and ask about the UK Forestry RCPP project.

To learn more about Kentucky NRCS and all of the programs and technical assistance they have available for Kentucky woodland owners, please visit <https://www.nrcs.usda.gov/wps/portal/nrcs/site/ky/home/>.



Pam Snyder, Kentucky Division of Forestry, instructs foresters on the new forest management template used in this project.

Photo courtesy: Billy Thomas

Coyotes in the Commonwealth

by John J. Cox

The story of wildlife in North America during the past 20,000 years is one that is bookended by two major extinction events. The first occurred during the end of the last Ice Age when many giants such as the mastodon and ground sloth disappeared because of climate change and overhunting by early humans who entered North America. The second extinction event began around 400 years ago with European colonization and the overexploitation of many species that were important sources of food and fur, such as beavers and bison. Wolves, bears, and mountain lions became targets of widespread persecution and soon disappeared across much of their range. These species and many more were greatly reduced in number and range or went extinct.

The coyote is one carnivore that stands in utter defiance of this extinction trend. It is a medium-sized (typically 20-40 lb) wild dog historically found in the grasslands, deserts, shrub-steppe, and some forests of central and western North America. Settlers moving into this region often referred to the coyote as the brush wolf, barking dog, or song dog given the wide vocal repertoire that carried for miles across the vast expanses of land, and perhaps unnerved a few weary travelers. Long before these newcomers, however, the coyote was a long established and important part of Native American culture and mythology, often portrayed as a clever trickster, thief, and deity.

Unlike its larger and more carnivorous cousin, the grey wolf, which is also found in Eurasia, the coyote is uniquely North American. While its larger carnivore competitors disappeared across much of their range, the coyote has instead spread across much of North America, from coast to coast, and from Alaska to Panama, despite millions spent in eradication efforts across two centuries. Widespread

forest fragmentation and creation of farms stocked with animals only created more habitat and feeding opportunities for the coyote. The rapid range expansion of this carnivore can be attributed to its adaptability. With a relatively small body size and more omnivorous diet that includes small rodents, insects and plants, the coyote is much better suited to coexist with humans than wolves. In addition, the coyote has a flexible social structure that can range from lone animals to small packs.

Having grown up in northeastern Kentucky, my impression of coyotes was what I learned from Looney Tunes and in western lore. Little did I know that this clever canid first appeared in Kentucky around 1953. Although conventional wisdom from wildlife biologists was that coyotes increased in number after portions of the Ohio and Mississippi rivers froze during the blizzard of 1977, their initial colonization patterns into the Commonwealth



Dr. John Cox holding coyotes.

largely remain a mystery. Coyotes have since spread to all counties in Kentucky and are occasionally spotted within the urban boundaries of Lexington and Louisville, including the University of Kentucky campus.

As a young graduate student, I became intrigued with the coyote and the reasons behind its wildlife success story, a fascination that would lead into various research studies over the next 25 years. My research has sometimes been conducted via the capture, radio-



The coyote is one of the most adaptable animals and can be found in a wide range of habitats across the state.

collaring, and tracking of individual animals across a myriad of habitats, through examination of biological samples from live and dead animals and, at other times, by learning about their diet through examination of scats or by studying their prey.

Our work and others found that as coyotes spread east from their historic range in the central and western United States, they interbred with domestic dogs, red wolves, and gray wolves, particularly along the leading edge of their colonization front. Under normal circumstances, behavioral barriers prevent these species from interbreeding; however, when mates are scarce, hybridization can occur. As coyotes colonized the northeastern United States and southeastern Canada, they occasionally bred with gray wolves. In the southeastern United States, they sometimes mated with the few remaining red wolves or with domestic dogs. Consequently, eastern coyotes can display physical characteristics picked up from hybridization events, including larger body size, wider jaw, and fur colors and characteristics of wolves or dogs. We found that around 10% of coyote-like canids in Kentucky appeared to be coyote-dog hybrids, or “coydogs” (Cox et al. 2001), and more recently while studying coyotes in Louisiana (Murphy et al. 2018), that at least one Kentucky coyote was a descendent of a past coyote-grey wolf hybridization event. The evidence therefore suggests that some coyotes in Kentucky have some degree of wolf ancestry and that they can and do sometimes breed with dogs.

Coyotes often get blamed for causing population declines of both large and small game species, but the direct evidence for that is lacking in many places they have been studied. Coyotes certainly prey on species such as the white-tailed deer (particularly fawns), eastern cottontail rabbit, squirrels, and some game birds, but their diet often consists primarily of rodent pests, carrion, insects, and plants. We examined nearly 500 coyote scats from southeastern Kentucky and found that their diet was highly varied across the year and by vegetation cover type, with major seasonal shifts in foods consumed (Cox 2003). Rodents, cervids (deer and elk), rabbits, plants, and insects were the major food items, but much of the deer and elk in coyote scats collected in fall and winter was likely scavenged given its coincidence with deer gun season and the death of some elk released into Kentucky. Coyotes also consumed grasshoppers, pokeweed and autumn olive berries, and persimmon during the summer and fall.

By studying coyote prey survival, we gained additional insight into its ecological role. A radio-collar study of elk calves in Kentucky suggested that survival is very high (90% after one year), and that coyotes have minimal impact on this large deer species (elk calves weigh as much or more than a coyote). In contrast, a separate study of white-tailed deer fawns in southeastern Kentucky indicated 44% of all fawns



In the right conditions, a coyote howl can be heard for miles.

All photos courtesy: Dr. John Cox

survived thru the first four months, but that predation from coyotes and bobcats was responsible for 77% of all deaths (McDermott 2017).

The coyote is a supreme survivor that has lasted through multiple Ice Ages, human attempts to eradicate it, and the vast habitat modifications we've made across the continent. In all of that, this small, adaptable song dog has thrived and will likely remain with us well into the future. Some Native American tribes believe that long after humans disappear, the coyote will be the last animal on Earth.

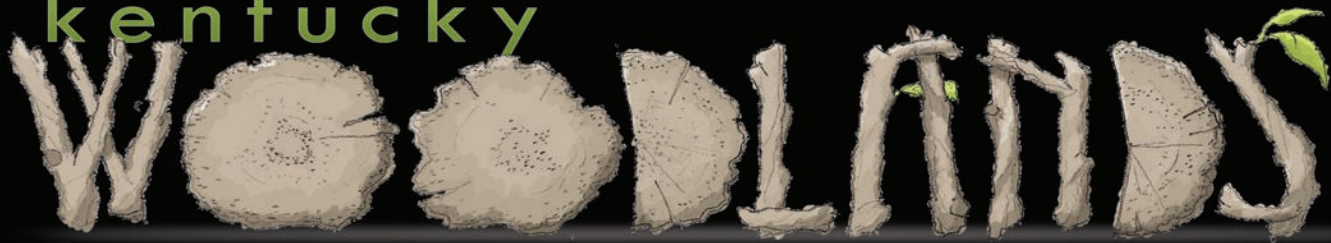
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About the Author:

John J. Cox, Ph.D., UK Department of Forestry and Natural Resources Associate Professor of Wildlife and Conservation Biology. His interests include: wildlife ecology and management, conservation biology, restoration ecology, human dimensions in conservation, and environmental ethics.

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Ohio River Valley Woodlands and Wildlife Workshop

Kentucky is the host state for the 2020 Ohio River Valley Woodlands and Wildlife Workshop (ORVWWW) which will be held on March 28, 2020, at the Boone County Enrichment Center in Burlington, KY. This annual workshop is designed to provide woodland owners with forestry and wildlife related educational opportunities. The workshop features forestry and wildlife experts from Indiana, Kentucky and Ohio who will address the questions and concerns that you have with the management of your

property. Topics for the 2020 ORVWWW include sessions on the myths about herbicides, tree identification, maple syrup potential, snake identification, managing pollinators, and more. Visit <http://tristatewoods.ca.uky.edu/> for more information or call 859.257.7597.

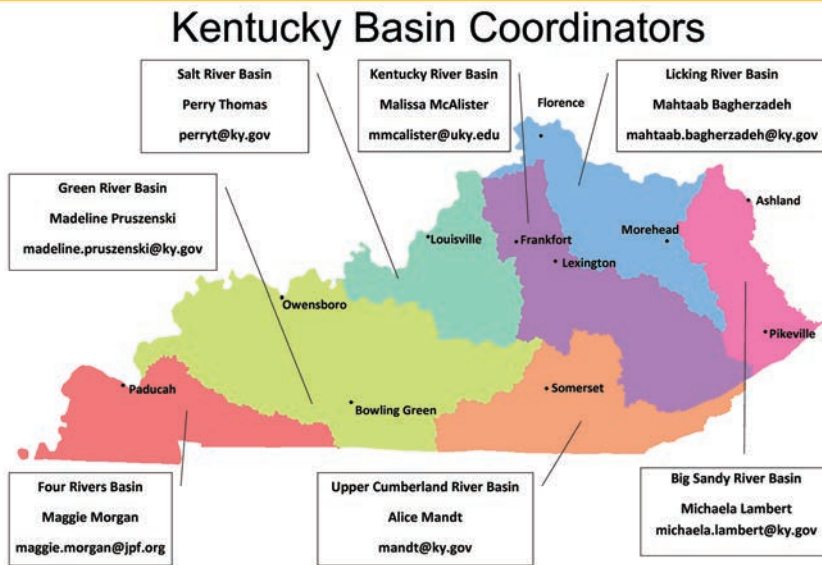


Get Involved in Your Watershed

by Michaela Lambert, Big Sandy River Basin Coordinator

Kentucky is divided into 7 major river basins (watersheds), each of which has an assigned Basin Coordinator, affiliated with the Kentucky Division of Water (DOW). A major goal of the Basin Coordinators is to organize and lead a Basin

Team to facilitate communication and coordinate efforts among stakeholders working towards achieving better water quality in their basin. The Basin Coordinator makes sure that lines of communication are open and active (ex. meetings, newsletters, workshops), finding ways to provide professional development opportunities to basin team members by inviting relevant speakers, and also bringing information about what resources the Division of Water has to offer. In addition, Basin Coordinators help stakeholders plan for and manage grants within their basins. These grants are for watershed plan writing and implementation of Best Management Practices (BMPs) such as septic repair and replacement, assistance with connecting to sewer utility lines, rain garden installation, riparian buffer restoration, fencing livestock out of streams, and



many more to improve and protect water quality. To learn more about the projects within your basin, watershed planning grants, or to participate in your local basin team, please contact your basin coordinator (see map) or call 502.564.3410.

Upcoming Dates To Remember:

2020 Dates:	Event:	Location:	Contact:
Feb. 1	Kentucky Maple Day	Various locations	https://forestry.ca.uky.edu/ky-maplesyrup
Feb. 6, 13, 20, 27 March 5	Getting To Know Your Woodlands Webinar Series	Webinar Series via web	www.ukforestry.org
March 24-25	KY Woodland Owners Assoc. Annual Meeting	Lake Cumberland Resort Park	www.kwoa.net
March 28	Ohio River Valley Woods and Wildlife Workshop	Boone County Enrichment Center	www.tristatewoods.org or 859.257.7597

NEWS TO USE

Getting to Know Your Woodland Webinar Series: Next Steps

UK Forestry and Natural Resources Extension is teaming up again with universities around the region to offer the next round of the Getting to Know Your Woodland Webinar Series. This all-new webinar series will be hosted live by participating County Extension Offices. This 5-part webinar series will take place on February 6, 13, 20, 27 and March 5, 2020 and cover the following topics: “Woodland Management: What is Right for You and Your Woodland?”; “Understanding the Financial Aspects of Woodland Management”; “More than Timber: Income Opportunities

from Non-timber Forest Products”; “Launching your Woodland Legacy: Intact, In Forest and In Family Ownership”; and “Kentucky Forestry and Wildlife Assistance”. For more information and to find the nearest hosting location please visit http://forestry.ca.uky.edu/webinars_upcoming.



Kentucky Maple Day Set for February 1, 2020



The Kentucky Maple Syrup Association (KMSA) and the University of Kentucky Cooperative Extension Service have organized the first Kentucky Maple Day on Feb. 1, 2020. Kentucky has a growing maple syrup industry and the Kentucky Maple Day is an excellent opportunity for you and your family to visit a maple syrup operation in Kentucky and purchase maple syrup and other maple related products. To find the closest participating maple syrup operation please visit <https://forestry.ca.uky.edu/ky-maplesyrup>

Maple Syrup Research Program Launched

The University of Kentucky Department of Forestry and Natural Resources has created a Kentucky Maple Syrup Research Program to help maple syrup producers in Kentucky. This research program, supported by grants from the Kentucky Natural Resources Conservation Service, is investigating statewide maple syrup production potential, economic contribution, on-farm cost-benefit analysis, and biological

assessments of site and tree factors affecting maple sap volume production and sugar content. To be successful, this research must work closely with Kentucky maple syrup producers to collect the critical data needed.

To be involved with this research please contact Billy Thomas at billy.thomas@uky.edu or 859.257.9153.



Have you listened to From the Woods Kentucky Podcasts Recently

Hopefully, you have had a chance to listen to some of the podcasts being produced by UK Forestry and Natural Resources employees Reneé Williams and Laura Lhotka. Each week Reneé and Laura interview people connected to forestry, wildlife, and natural resources that should be of interest to woodland owners and those that want to learn more about woodlands and wildlife in Kentucky. Recent shows on forest fires, the White Oak Initiative, management plans, ticks, snakes, timber harvesting, and woodland owner resources should be of interest to Kentucky woodland owners. All of the shows are recorded and made freely available for streaming from <http://forestry.ca.uky.edu/fromthewoodsky> or you can download the podcasts from wherever you receive your podcasts.





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Don't miss out on the 2020 Kentucky Woodland Owners Short Course
coming this summer!!! Visit www.UKForestry.org for dates!

