

green horizons

Growing tomorrow's future today.

Spring 2018

A newsletter from the Center for Agroforestry in conjunction with the Forest and Woodland Association of Missouri <http://www.centerforagroforestry.org/pubs/newsletters.php>

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How to Manage a Sugar Bush

By Hank Stelzer, University of Missouri Extension, School of Natural Resources

A sugar bush refers to a forest stand dominated by sugar or black maple trees that can be tapped to yield sap which can then be processed into maple syrup. This article is the first of two that will appear in Green Horizons on producing maple syrup in Missouri, and will focus on managing the trees for maximum sap production. The second piece, to appear in the fall issue, will focus on how to collect and process the sap.

Some, if not most, foresters (and perhaps a few landowners) view sugar maple as a weed. By definition, a weed is a plant growing where it is not wanted. But, in a sugar bush, sugar maple IS wanted. This should serve as a reminder that 'beauty is in the eye of the beholder' or in this case 'the objectives of the landowner'.



A sugar bush at the CAFNR Baskett Research and Education Center near Ashland, MO.

The structure of the sugar bush refers to the numbers, kinds, and ages of trees present at different stages of its development. Since sugar bushes should be managed for the largest volume of sugar-rich sap over a given area, a goal is to have an optimum number of sugar maple trees on the site that produce high volumes of sweet sap.

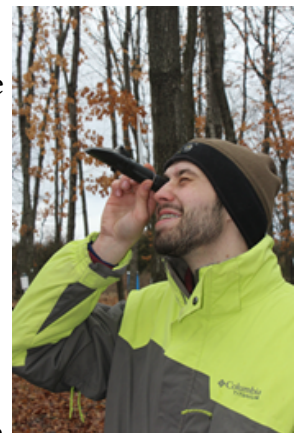
It is important to know which trees will produce the largest volume of sugar-rich sap. Desirable trees are vigorous and fast growing, with large crowns well exposed to sunlight. Trees growing one inch in diameter every two to five years yield as much as 30 percent more sap than those that grow an inch in seven to ten years.

Of two trees with the same stem diameter, one with a crown diameter 50 percent larger than the other can yield twice as much sap. Trees with greater crown length relative to height also produce more sap. In other words, trees with large crowns produce and accumulate more food energy reserves during the summer months. In turn, these reserves provide the sugar the following spring

Trees with sweeter sap usually yield larger quantities of sap. The sugar content of maple sap normally ranges from 1 to 4 percent. Sap sweetness is primarily genetically controlled. Sap-sugar content should be considered in tree selections as it will have a significant and long-lasting effect on sugarbush productivity and income. Sap-sugar content is best measured in the spring with a sugar refractometer.

The amount of direct sunlight received by the crown also influences sap sweetness. Trees in the open have a higher sap-sugar content than similar-size trees in dense forests. Sugarbush management, therefore, should focus on selecting trees that produce the sweetest sap, and encouraging the development of their crowns by carefully thinning the stand.

An axiom of ecology states that the stability of a forest community is enhanced by diversity. Stands with high and low species diversity are affected differently by climatic extremes or biotic agents. Presumably, this is the result of differences among tree species in susceptibility to these factors. A single-species sugar bush follows this axiom. *continued on page 7*



A refractometer is a device used to measure the sugar content of a solution, be it maple syrup or maple sap.

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Missouri Agroforestry and Woody Crop Establishment Funding through the Environmental Quality Incentives Program (EQIP)

Lauren Cartwright, Missouri Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) is an agency of the US Department of Agriculture (USDA) that is responsible for assisting landowners to address resource concerns on private land to improve our soil, water, air, plants, animals (both domestic and wild), and improve energy efficiency. The vision of NRCS is to ensure productive lands in harmony with a healthy environment.

Agroforestry is a unique land management approach that intentionally blends agriculture and forestry to enhance productivity, profitability, and environmental stewardship. In 2010, the USDA-NRCS and USDA Forest Service, along with numerous other partners and stakeholders, developed the USDA Agroforestry Strategic Framework to increase awareness and support for agroforestry across the country. As a result, starting in fiscal year 2017, NRCS in Missouri offered a dedicated funding pool for Agroforestry and Woody Crop Establishment within the Environmental Quality Incentives Program (EQIP).

In Fiscal Year 2017, Missouri NRCS obligated \$41,579 in funding into contracts to producers to implement agroforestry or establish woody crops. These contracts included practices such as Alley Cropping, Windbreak/Shelterbelt Establishment, Silvopasture Establishment and Tree/Shrub Establishment.

The Fiscal Year 2018 application deadline was November 17, 2017 and Missouri NRCS is currently completing the process of offering funding to eligible applicants. As of April 2, 2018, \$87,000 in funding has been offered to eligible applicants for Agroforestry and Woody Crop Establishment.

Producers interested in applying for funding through EQIP for Agroforestry and Woody Crop Establishment can submit an application to their local NRCS office at any time. These applications will be held for consideration for funding for the Fiscal Year 2019 EQIP funding period. The application form is available [here](#). The deadline for applications to be submitted for Fiscal Year 2019 funding has not been established yet. Once a deadline is determined it will be posted [here](#).

To submit an application and make an appointment to visit with an NRCS certified conservation planner, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app>).

Online resources to learn more about NRCS and EQIP:

- ✓ National NRCS Webpage <https://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/>
- ✓ Missouri NRCS Webpage <https://www.nrcs.usda.gov/wps/portal/nrcs/site/mo/home/>
- ✓ University of Missouri Center for Agroforestry, Agroforestry in Action publication *Using NRCS Technical and Financial Assistance for Agroforestry and Woody Crop Establishment through the Environmental Quality Incentives Program (EQIP)*. http://www.centerforagroforestry.org/pubs/NRCS_AgroforestryandWoodyCrop.pdf



"Stop the Invasion! Join the Fight!"

Exotic invaders are infiltrating a habitat near you! Come learn about invasive species that are raiding our yards, roadsides and natural communities, and how you can help the Show-Me State give them the boot!

Learn what you can do at this year's Missouri State Fair Mo-DOT Highway Gardens on Friday, August 10th, 10am - 2pm.



Healthy Yards for Clear Streams: A New Extension Program for Homeowners

Hank Stelzer, University of Missouri Extension, School of Natural Resources

Healthy Yards for Clear Streams is an educational program designed to help homeowners be environmentally responsible with lawn and landscape practices. The goal is to promote practices that create beautiful lawns, gardens, and landscapes while reducing unnecessary use of pesticides and fertilizers that may run off and contaminate local streams and water bodies.

Oftentimes, the first thing that comes to mind when we think of water pollution is those chemicals or untreated sewage coming out the end of a pipe and into a stream or river.

But, there is another source of water pollution. As runoff from rainfall, excessive irrigation, or snowmelt moves across the landscape, it can pick up and carry away not only soil, but fertilizers and pesticides.

Recently, the United States Fish and Wildlife Service projected that homeowners use up to ten times more chemicals per acre on their lawns and landscapes than farmers do. Some of these chemicals are finding their way to our streams and lakes. A study by the United States Geological Survey found at least one pesticide, and often more than one, in almost every stream and fish sample tested, and in about half of the samples drawn from wells throughout the country.

Most people believe that storm drains go to a sewage treatment plant, but most are completely separate systems. And these stormwater systems are piped directly to streams.

In 1987, amendments to the Clean Water Act established the Nonpoint Source Management Program. The amendment addressed the need for greater federal leadership to help focus state and local nonpoint source efforts. In 1999, EPA Stormwater Phase I and II Final Rules were established requiring communities implement a public education program about the impacts of stormwater discharges on local waterbodies and the steps that can be taken to reduce pollution.

Healthy Yards for Clear Streams has two simple goals:

- (1) Learn what you can do to reduce the amount of chemicals and sediment leaving your yard, and then
- (2) Spread the word by showing your friends and neighbors how they can do the same!



The program consists of seven comprehensive, yet simple, units:

- Healthy Soils for Healthy Plants
- Right Plant, Right Place
- Basic Lawn Care
- Vegetable Gardens, Flower Beds, and Groundcover
- Basic Tree Care
- Integrated Pest Management
- Sustainable Landscaping

By implementing a small number of practices in each unit, you can earn the “Yard of Merit” distinction for your yard. These include such practices as testing your soil for proper nutrient levels, purchasing native plants, cutting your grass a little higher to reduce weeds naturally, establishing shade-tolerant groundcover under trees, identifying the pest before reaching for the pesticide, and establishing rain gardens to keep rain water on your property. The end result is a beautiful yard that also helps protect water quality.

Healthy Yards for Clear Streams is designed to be an online course and will be available on the MU Extension website in June. It will also be available through your local county Extension center if there is sufficient interest in a live, one-day workshop. Cost of the program is \$40.

Theodore Roosevelt said it best, “Do what you can, with what you have, where you are.” Clean water starts at home. What you do in your yard and garden can either help protect water quality, or be a potential source of pollution.

While the contribution from your individual yard may seem small, the effect you can have on those around you can really add up. And in so doing, protect our streams, our communities and our children’s future.

Spotted Lanternfly: Beautiful Bug, Sticky Mess

Sarah Phipps, Missouri Department of Agriculture

The feeding habits of an invasive bug strikes again! Spots on the front wings and flashes of red on the back wings make this inch-long spotted lanternfly (*Lycorma delicatula*) a beauty! While this attractive planthopper has a striking appearance, don't admire for too long as it's just a hop, skip, and a jump away from sullyng a plant near you. These insects can jump 6 to 9 feet to evade danger. When they land on vehicles, they can hitch a ride to new areas. Movement of this pest can also occur by way of egg cases that they lay on hard surfaces such as tree bark, rail cars, shipping pallets, and many other outdoor items. Egg cases are easily overlooked as a mode of transportation because they look like a smear of mud.

Although native to China, India and Vietnam, the spotted lanternfly has taken a foothold in thirteen Pennsylvania counties since its first detection in 2014 on a shipment of imported stone products. A subsequent detection occurred in Virginia when the lanternfly hitched a ride on stone products. An established population outside Pennsylvania has been found in Frederick County, Virginia. Additional detections have been reported in Delaware, Maryland, New Jersey and New York.

This sap feeding planthopper feeds on over 70 plant species including grapes, fruit trees, various hardwoods (including oak, walnut and maple), hops and row crops. It also has a close association with *Ailanthus* (Tree of Heaven). As it voraciously feeds in groups, it secretes a sticky, sweet substance called honeydew that allows black sooty mold fungi to grow, tarnishing plants and the surrounding environment.

We'd be much better off if the gummy mess was limited to homeowners having to power wash the stickiness off the back porch! Unfortunately, the real clean up happens when this pest visits commercial ventures like vineyards, fruit growers and other farms. Pennsylvanians, in particular, have experienced the true economic disorder this insect can create.

Spotted lanternflies were first detected in Pennsylvania vineyards in 2016, with additional vineyard detections in 2017. They create messes wherever they go and are also reducing yields in some vineyards. Vineyards are particularly

susceptible to the lanternfly due the direct damage they inflict with their piercing-sucking mouthparts on grapevines, which can make the grapes unsuitable for quality wine production. Unfortunately, the honeydew they leave behind causes mold to grow on the vines and foul the fruit long after they have moved on to the next plant.

The lanternfly's close association with *Ailanthus* warrants more research. Currently, it is believed that the lanternfly requires *Ailanthus* to complete its lifecycle. Management efforts include wrapping brown sticky bands around the tree to target and catch nymphs. Removal of female *Ailanthus* host trees and treating the male *Ailanthus* trees with systemic insecticide also appears to help significantly reduce the population.

Due to the dramatic expansion of the lanternfly that occurred in Pennsylvania, the USDA provided \$17.5 million in emergency funding to help stop the spread of spotted lanternfly throughout Pennsylvania and neighboring states.

While this 'bad bug' has not been found in Missouri yet, early detection is vital. The eggs hatch May - June and are black with white spots during the first 3 nymphal stages. Some observers advise that the nymphs look like small ticks. Adults can be seen as early as mid-July. Keep an eye out for the easily hidden "mud-smear" egg cases

which can be seen from Oct. - June. Anyone who finds a suspected lanternfly is encouraged to capture and preserve it by putting it into an alcohol-filled vial. If this is not possible, a good picture could help aid us in early detection. Please make reports to the Missouri Department of Agriculture State Entomologist by emailing collin.wamsley@mda.mo.gov or calling 573-751-5505.



Adult spotted lanternfly. Photo credit Lawrence Barringer, Pennsylvania Department of Agriculture, www.Bugwood.org.

More information about the spotted lanternfly can be found at:

- ✓ www.agriculture.pa.gov/spottedlanternfly
- ✓ <https://extension.psu.edu/spotted-lanternfly-on-grapes-and-tree-fruit>

2018 Missouri Tree Farm Conference: A Successful Event

Laurie Coleman, Executive Director, Forest and Woodlands Association of Missouri

This year's Tree Farm Conference was held April 13-14. The event commenced on Friday afternoon at the Missouri Department of Conservation (MDC) Northeast Regional Office in Kirksville, MO. Matt Jones, Missouri Tree Farm Committee Chair, introduced Laurie Coleman, Executive Director for the Forest and Woodland Association of Missouri (FWAM). FWAM was founded in 2011 as a public advocacy voice for privately owned woodlands, to promote healthy, productive and sustainable forests and trees. They also administered the Missouri Tree Farm System. Jones also introduced Lisa Allen, MDC Forestry Division Chief, who welcomed attendees.

David Watson, Independent Financial Advisor with D.A. Watson & Company and Hank Stelzer, State Forestry Extension Specialist with the School of Natural Resources at the University of Missouri started off the afternoon with a presentation on succession planning. They discussed the importance of communicating with one's heirs, and described legal approaches to transferring family forestland.

Robbie Doerhoff, MDC Forest Entomologist, gave a Missouri forest health update. She discussed common diseases and pests affecting our native trees, including identification tips and management possibilities. Damaging pests, fluctuating weather patterns, and invasive species all play key roles in the health of our woodlands.

Danny Hartwig, MDC Forestry Regional Supervisor/CWD Mandatory Sampling Incident Commander, provided a session on Chronic Wasting Disease (CWD). CWD is a deadly illness in white-tailed deer and other members of the deer family, called cervids. The disease has been found in Missouri and is slowly spreading.

Hank Stelzer ended the afternoon programs with a discussion on the status of white oak in Missouri and lack of good reproduction. The key to oak regeneration success is reducing overhead competition to increase light to the forest floor for abundant and vigorous advance reproduction.

Friday evening was filled with much camaraderie as guests enjoyed a social, silent auction and award ceremony. Mike Morris, MDC Forest Products Supervisor presented the Outstanding Tree Farm Inspectors with plaques and Matt Jones awarded Garry Gordon and Elaine De Jovin as the 2017 Tree Farmers of the Year. Garry and Elaine have actively managed their Putnam County property for timber and wildlife



Above: Gary Gordon and Elaine De Jovin proudly display their Tree Farm sign at the entrance to their 142-acre property in Schuyler County.

Below: Gary and Elaine have successfully integrated good forest management in stands capable of producing quality timber and early successional wildlife habitat management on other parts of their property to favor their much-beloved woodcock.



for nearly 35 years. They have been Tree Famers for 31 years and have completed management on nearly every acre of their 142-acre property.

On Saturday morning approximately 40 attendees met at the Savannah Ridge Tree Farm where they were greeted by hosts Garry and Elaine. The morning was a little damp and muddy but that didn't deter attendees on the walking tour. Craig Williamson, MDC Private Land Conservationist, along with Consulting Forester Phil Sneed and MDC Resource Forester Richard Nessler gave presentations on hardwood management, harvesting (group openings, clearcuts, single-tree harvests), timber stand improvement, food plots and prescribed fires. Someone asked what was the best piece of advice Garry and Elaine could give a beginning Tree Farmer. "That's easy," said Garry, "don't be afraid to cut a tree."

Missouri Managed Woods Update

Steve Westin, Missouri Department of Conservation

In the Fall 2017 issue of Green Horizons I wrote an article introducing a new Missouri Department of Conservation (MDC) program called Missouri Managed Woods (MMW). I would like to provide you with an update on the status of MMW.

The first land was enrolled in the program in late December of 2017. It is located in Pettis County, and covers over 150 acres of wooded lands. Since then, five additional properties covering nearly 1,500 acres have been enrolled. Currently fifteen more ownerships totaling over 3,000 acres are in various stages of the enrollment process.

Recall that the purpose of MMW is to encourage more private forest landowners to get their land under active, long-term, professionally directed management. Landowners who are actively managing their woods under an approved plan, such as members of the Missouri Tree Farm System, or those who are interested in developing and implementing a plan on their lands, could benefit from this program.

Program Requirements:

- Minimum of 20 contiguous acres of wooded land
- Maximum market value of no more than \$3,500 per acre
- No structures or large bodies of water on enrolled lands

Landowner Benefits & Services:

- Priority assistance from a professional forester
- Forest management plan based on the landowner's goals
- Increased MDC cost share rate to assist with forest management practices
- Timber harvest assistance
- Sustainable timber harvest incentive to offset yield tax
- Timber basis preparation if appropriate

Landowner Obligations:

- Landowner must sign and agree to implement their management plan
- Property boundaries must be clearly marked
- Livestock must be fenced out of the woods
- Pay yield tax on timber sale stumpage value
- Enrollment in the Missouri Tree Farm program is encouraged

For more information and a Missouri Managed Woods application, call 877-564-7483, or visit:

<https://mdc.mo.gov/property/property-assistance/missouri-managed-woods>

The Bid Box

Hank Stelzer, MU Extension, School of Natural Resources

I will keep things pretty simple for this installment of The Bid Box. While three bids might seem like a low number to some landowners, especially with today's relatively strong markets, keep in mind that three bids are better than the one offer you get from the logger showing up unannounced at your doorstep! And with a forester on your team, you are now an informed seller. Knowledge is power!

Ste. Genevieve County, Missouri

- 77 acres • 660 trees
- Estimated volume: 134,852 bd. ft. (International Scale)
- Mostly a white oak stave sale with some low-grade lumber and railroad tie timber
- Forester valued the sale between \$27,000 and \$33,700
- Three bids received
 - o \$40,455 o \$29,630 o \$23,200
- Landowner took the high bid
- Return: \$525 per acre

If you are thinking about selling your timber, contact your professional forester now! Not only will they help you get the highest price for the trees in your woodlots that need to be harvested, but they can help ensure future harvests are profitable too! To help you become familiar with some of the aspects of selling timber, check out the following MU Guides:

[G5051 Selling Timber: What the Landowner Needs to Know](#)

[G5057 Basic Elements of a Timber Sale Contract](#)

[G5056 Managing Your Timber Sale Tax](#)

These Guides will help you better understand the ins and outs of marketing your timber and help you help your professional forester!



How to Manage a Sugar Bush *continued from cover*

The advantages of a maple monoculture are convenience and economy of operation. However, the single species stand, and often the steps needed to create it, can lead to problems. These include rapid development of insects and disease pathogens that favor sugar maple, and gradual adverse changes (perhaps depletion) in certain nutrient relationships. Sugar maple monocultures on poor sites are often affected more adversely by these and other problems than are sugar bushes on good sites. Understandably, for economic reasons, sugar bush operators tend to encourage monocultures. Because this practice may increase susceptibility to various maple problems, it is important to monitor stand conditions and pest activities more frequently and carefully than in other forests.

Crop Tree Release

The goal of sugar bush development is to ensure sufficient numbers of well-spaced, high-quality, productive sugar maple trees. Ideally, crop trees should be chosen as early as possible as this will allow greater flexibility in tree selection. Regardless of the stage of stand development (sapling, pole, or sawtimber size), the following steps for developing a sugar bush are recommended.

Step 1, select the location of potential crop trees at a spacing of 25 to 30 feet in all directions. This should result in a stocking of approximately 64 trees per acre when they are about 12 inches in diameter at 4.5 feet or at "breast height" (d.b.h.).

Step 2, find the tallest maple trees with the widest and longest crowns at each of these locations. From among these candidates, choose the one with the fewest crown or stem injuries, deformities, or cankers.

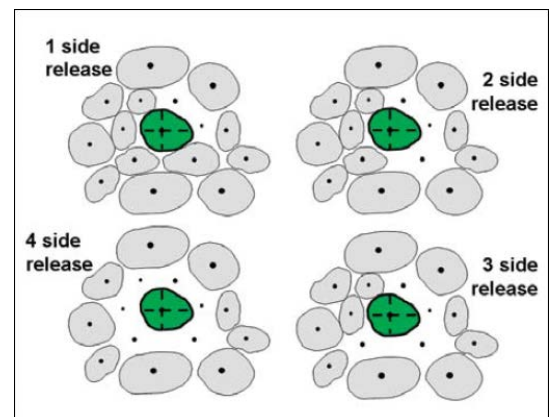
Step 3, measure the sap-sugar content of the selected tree in the spring and compare it to that of other candidates at that location. If its sap is as sweet or sweeter than the others, it becomes a crop tree. If the sap-sugar content is significantly lower (by 1 percent or more), it may be advisable to repeat the selection process (steps 2 and 3) from among the other candidates.

Step 4, release the selected crop tree by removing neighboring trees whose crowns touch the crop tree. The crop tree should be released on at least two sides, preferably all four. This can be done in several steps if removing all competing trees at once would create undesirable large openings. Caution also should be taken so that the removal of non-competing trees does not create overly large openings.

Step 5, repeat release cuttings when the branches of surrounding trees once again begin to touch the crown of the crop trees. Eventually, only crop trees will remain. Once this point is reached, no further thinning should occur. Providing space for crown development allows the maximum production of sugar-rich sap with minimum disturbance to the site

Step 6, Monitor the conditions of the crop trees each year. Remove only diseased, badly damaged, or dead trees. Removing these trees

will reduce sources of infection, help prevent uncontrolled damage to in-place tubing systems, allow crown expansion of the remaining trees, and encourage the development of regeneration. Should damage or the death of large numbers of trees make it necessary to regenerate the sugar bush, seek advice of a professional forester.



It is desirable to release the selected crop tree on at least two sides, preferably all four, so there is at least a 10- to 15-ft. gap between the crop tree and its nearest neighbor. This allows for a healthy, vigorous crop tree and more maple sap!

continued on page 8

MU Programs Join Forces for Successful Woodland Workshop

Lindsey Hethcote, Agronomy Field Specialist, MU Extension

The Missouri Woodland Steward Program and the MU Center for Agroforestry recently joined forces for two recent workshops held at MU's Wurdack Research Center in Cook Station, Missouri. The workshops, entitled "Managing Forest Resources: Timber Stand Improvement, Forest Farming and Mushroom Cultivation", were both highly successful. Attendance was superb, with 77 people traveling to the Ozark research center from all over the state of Missouri, as well as a few from Illinois.

During the workshops, participants learned theory and background information in the classroom, and then went outside to partake in hands-on activities. During the morning session, Hank Stelzer, Associate Professor of Forestry Extension at MU, gave attendees a crash course in tree identification and the basic principles behind timber stand improvement. After his presentation, participants went out into the woods at Wurdack and learned about crop tree selection. They discussed why they would select certain crop trees, as well as methods available to eliminate unwanted trees.

In the afternoon, Gregory Ormsby Mori, Education

Hethcote and Stelzer oversee workshop participants as they inoculate white oak logs with Shiitake spawn.



and Outreach Coordinator at University of Missouri Center for Agroforestry, taught about forest farming and mushroom cultivation. Participants covered the basics in the classroom and then headed outside where they inoculated their own white oak log with Shiitake spawn to take home. Gregory also provided a hands on demonstration of how to grow Oyster mushrooms on totems, as well as how to grown Wine Cap Stropharia mushrooms on a bed of mulch and straw.

The workshops were coordinated by Dusty Walter, Superintendent of Wurdack Research Center, Brent Booker, Farm Manager at Wurdack Research Center and Lindsey Hethcote, Crawford County Agronomy Specialist for MU Extension. The workshops were hands-on and covered topics that are of much importance to Missourians living in and around the Ozarks.

How to Manage a Sugar Bush *continued from page 7*

Should one fertilize a sugar bush? A question asked by many sugar bush operators is: can fertilization increase the growth rate and health of trees in my sugar bush? Sugar bushes do appear to be appropriate forest stands to fertilize because they generally are not large, are easily accessible, and yield an annual monetary return.

Trees need the essential elements nitrogen, phosphorus, sulfur, calcium, potassium, and magnesium, as well as several minor elements. When all of these elements are plentiful in the soil, growth (vigor) will be at a maximum. But where there is a deficiency (or excess) of even one essential element, tree growth and vigor may be impaired. Fertilization is one means of correcting such nutrient imbalances. In practice, however, fertilizing a sugar bush is risky, and results of experiments have been mixed. Negative effects usually result from using the wrong fertilizer or combination of elements, and worsening any nutrient imbalance that existed. Fertilization should be considered only when growth is poor or vigor is low, and even then it would be a last resort.

No fertilization program should be undertaken before a foliar and/or soil analysis has been conducted. Foliar symptoms may indicate deficiencies, but they are not always reliable. In addition, the severity of the deficiency and the amount of nutrient required to correct it cannot be determined from the symptoms. Moreover, because the nutrient content of the foliage varies during the growing season and, for some elements, with the location within the tree crown, a precise sampling methodology must be followed.

Generally, about 50 leaves from each of 5 to 10 trees collected in midsummer at a given height in the crown will suffice for establishing the nutrient status of a stand. Check with a specialist before sampling to learn about particular sampling requirements.

Liming the soil as a corrective measure has been suggested, but liming never has been a permanent cure for poor stand vitality. Too much lime may decrease the availability of certain nutrients and inhibit mycorrhizae, those fungi that live in close association with tree roots and enhance the ability of trees to take up nutrients. In general, the outcome of fertilization of sugar bushes is uncertain at best, and risky if done without adequate chemical analyses of soil and foliage.



Nursing Moms Need Shaggy Bark: Consider Bats During Summer Forest Management

Rebecca Landewe, The Nature Conservancy

Many people probably think of Halloween at any mention of bats, but if we're managing our woods, the summer season is an important time to consider these important creatures. Missouri is fortunate to be home to many bat species, including several of conservation concern. This means that Missourians have the opportunity to protect and enhance habitat for these unique flying mammals and minimize any potential negative impacts of our management activities.

Like humans, bats are mammals and nurse their young. Baby bats, called pups, are born in May or June and require two to five weeks of nursing from their mom before they can fly and forage for insects. Some bat species, like the red bat, roost in trees year-round. What many may not realize is that trees are important for cave-hibernating bat species too. During the late spring and early summer, mother bats leave the cave with their pups, seeking out live and dead trees with shaggy or loose bark as roosting sites. In these protected niches, they nurse their pups until they are strong enough to fly and forage for insects on their own.

Well-managed forests provide good habitat for bats, but a few additional considerations can help. For example, retaining dead snags or shaggy-barked trees, like shagbark hickory, in your forest could provide suitable roosting habitat for bats. Conversely, cutting a tree at the wrong time could directly impact their ability to survive the summer roosting season.

If you're planning on doing management this summer, there are several things you can do to minimize the impacts on bats. The US Fish and Wildlife Service has several recommendations to help bat species, like the endangered Indiana bat or the threatened northern long-eared bat. Some of the recommendations include:

- Conduct timber harvests and prescribed burns between November 15 and March 31 while bats are hibernating. The spring and summer months are when bats are reproducing and emerging from cave habitats to roost and raise their young in the woods.
- For northern long-eared bats, avoid cutting with ¼ mile of known cave habitats (called hibernacula) or roost trees, especially during June and July when mothers are raising their pups.
- Retain snags and large-diameter (greater than 11 inches) trees with shaggy or flaking bark, especially shagbark hickory.
- Do not harvest in buffer zones around creeks and streams.

This is a general list of a few recommendations. For complete details visit:

- https://www.fws.gov/northeast/pafo/pdf/endspecies/timbermgtguide_Ibat_hibernacula.pdf
- <https://www.fws.gov/midwest/endangered/mammals/nleb/faqsinterim4drulenleb.html>

Bat Facts

- There are at least 16 species of bats in Missouri, including the endangered Indiana and gray bats, and the threatened northern long-eared bat.
- Some bats use cave habitat year-round, others use caves during the winter, and some never use caves but rely on trees or buildings for roosting.
- Some species of bats migrate during the winter, just like birds, to more favorable climates.
- White nose syndrome is a disease caused by an invasive fungus that impacts hibernating bats. It has killed more than 5 million bats over the last 12 years in North America. <https://www.whitenosesyndrome.org/>
- Bats provide many benefits to humans, though it may be difficult to see at times. All Missouri bats eat insects, and one estimate indicates that a single bat can consume 600 mosquitoes an hour!



Species Spotlight: Sugar Maple

Hank Stelzer, MU Extension, School of Natural Resources

Sugar maple (*Acer saccharum*) is a deciduous Missouri native tree which will typically grow 40-80' tall with a dense, rounded crown. *Acer* is the Latin name for a maple tree and *saccharum* means sugary in reference to the sweet sap. As a side note, *Saccharum* is the genus name for sugarcane. This tree is a main component of the Eastern U.S. hardwood forest and is one of the trees which is most responsible for giving New England its reputation for spectacular fall color.

Leaves: Medium green leaves; 3-6" wide with 3-5 lobes; turn yellow-orange in autumn, sometimes with considerable color variations.

Flowers: Quite small, borne abundantly in clusters, each at the end of a long dangling flower stalk (pedicel). All these parts are light yellow-green, presenting a very bright display that stands out, but with little apparent detail, so might be mistaken for leaf-out, which hasn't happened yet (branch/leaf buds are just breaking when the bloom is in full force).

Fruit: A two-winged, horseshoe-shaped samara about 1" long, appearing in clusters, brown when mature in in the fall.

Twigs: Brown, slender and shiny with lighter lenticels; terminal buds brown, very sharp pointed, with tight scales.

Bark: Variable, but generally brown, on older trees it becomes darker, develops furrows, with long, thick irregular curling outward, firm ridges.

Wood: Straight-grained, fine-textured, hard, strong, and at 44 pounds per cubic foot (as heavy as red oak) the wood of sugar maple has high commercial value. Its sapwood, frequently 3-5" thick, appears much lighter in color than the slightly pinkish-tan heartwood. Some trees produce spectacularly figured wood in curly, fiddleback, quilt, and bird's-eye.

Known for its toughness and durability, sugar maple takes a pounding as bowling-lane surfaces, bowling pins, basketball courts, school desks, tool handles, and ladder rungs. On a gentler side, it makes up for much of the furniture we call "Early American." The wood also shows up as cabinets, countertops, cutting boards and butcher block. Trees with wavy woodgrain, which can occur in curly, quilted, and "birdseye maple" forms, are especially valued by wood turners. It is also widely used in the manufacture of musical instruments, such as the members of the violin family (sides and back), guitars (neck), and drum shells.

Pests: The species has no serious insect or disease problems... yet. However, it is susceptible to verticillium wilt, anthracnose, cankers, leaf spot and tar spot. Sugar maple is also susceptible to aphids, borers and scale. Leaf scorch may be a problem in drought conditions. Forest managers are keeping a watchful eye out for the Asian Longhorned Beetle (*Anoplophora glabripennis*, or ALB). This exotic, invasive insect threatens not only sugar maple, but a whole host of other hardwood tree species. It currently infests areas in Massachusetts, New York and Ohio.



The leaf, twig, fruit and bark of sugar maple (*Acer saccharum*)



Species Spotlight: Sugar Maple *continued from page 10*

Did You Know?

Native Americans taught the early colonists how to tap these trees to make maple syrup which has now become a multi-billion dollar industry in the U.S. and Canada. Other maple species can be used as a sap source for maple syrup, but some have lower sugar contents and/or produce more cloudy syrup than these two. Some other trees (birch, ash, etc.) can yield a useful syrup as well, though with different flavors.

Sugar maples engage in hydraulic lift, drawing water from lower soil layers and exuding that water into upper, drier soil layers. This not only benefits the tree itself, but also many other plants growing around it.

The sugar maple also exhibits a greater susceptibility to pollution than other species of maple. Acid rain and soil acidification are some of the primary contributing factors to maple decline. The increased use of salt over the last several decades on streets and roads for deicing purposes has decimated the sugar maple's role as a street tree.

The sugar maple is the state tree of the US states of New York, Vermont, West Virginia, and Wisconsin. And it is depicted on the state quarter of Vermont, issued in 2001.

Calendar of Events

Forest Farming Grower/ Industry Expo and Training Events

May 19 - 20, 2018 | Kingsport, TN and Duffield, VA | Appalachian Beginning Forest Farmers

On May 19, the Forest Farming Grower-Industry Expo and Training event in Kingsport, TN will bring together herb companies, apothecaries, and herbal product makers with experienced and aspiring forest farmers for a day of networking and learning. On May 20, a Forest Farmer Field Day will be held in Duffield, VA. It will include a tour of the Appalachian Harvest herb hub and Ryan Huish's forest medicinals farm, and a discussion on the economics of cultivating forest-grown medicinal herbs. The registration fee for each event is \$15. More information at <https://www.appalachianforestfarmers.org/>

Nutshell with Harry Hoch Turning Waste into Gold: Brush Chopping Equipment for Agroforestry

May 22, 2018 | Free Online Discussion at 6pm CT | The Savanna Institute

"Nutshells" are live online discussions with experts on practical topics in agroforestry and perennial agriculture. Limited space is available. Instructions for accessing discussions will be provided upon registration. More information and registration at <http://www.savannainstitute.org/events.html>

Missouri Woodland Steward Workshops

May 30, June 13, Sept. 10 and 24, 2018 | 6:30 - 9pm | University of Missouri Extension

On May 30th: Marketing Your Timber, at MU Forage Systems Research Center, 21262 Genoa Road, east of Linneus. For more information, contact the MU Extension Office in Linn County, 660-895-5123 or email tatev@missouri.edu by May 25.

On June 13th: Marketing Your Timber, at MU Extension Center in Jefferson County, 301 Third St., Hillsboro. For more information, contact Debi Kelly at 636-797-5391.

On September 10th: Getting to Know Your Woodland, at MU Extension Center in Jefferson County, 301 Third St., Hillsboro. For more information, contact Debi Kelly at 636-797-5391.

On September 24th: Woodland Management, at MU Extension Center in Jefferson County, 301 Third St., Hillsboro. For more information, contact Debi Kelly at 636-797-5391.

All workshops take place from 6:30 to 9:00pm. Cost is \$25 per person or \$30 per couple.

More events on the next page!

Calendar of Events Continued...

Farming the Woods: Profitable Agroforestry for Homesteads and Farms

June 4 - 6, 2018 | Craftsbury Common, VT | Sterling College

This 1 CEU course will offer you skills to sustainably care for your woodlot and focus on log-grown mushrooms, tree saps and syrups, and silvopasture (grazing animals in the forest) as three of the best options for both the homestead and farm scale. More information at <https://sterlingcollege.edu/course/farming-woods-profitable-agroforestry-homesteads-farms/>

6th Annual Agroforestry Training Academy

July 22 - 27, 2018 | Columbia, MO | University of Missouri Center for Agroforestry

This week-long intensive training includes hands-on and project-based approaches, field visits and classroom workshops for practical on-farm agroforestry planning and design for farmers, landowners, agriculture and natural resource professionals. Full scholarships are available for women and minorities in Missouri, and veterans throughout the US. Register before May 25. More information at <http://centerforagroforestry.org/academy/2018/RegistrationBrochure.pdf>

NAFEX Fruits of the Heartland Conference

July 26 - 28, 2018 | Danville, IL | North American Fruit Explorers

Fruits of the Heartland is a joint conference of the North American Fruit Explorers, the Midwest Fruit Explorers, and the Savanna Institute. The conference will include presentations on growing and marketing fruit, hands-on demonstrations, and farm tours. More information at <https://nafex.org/index.php/nafex-annual-meeting/>

Upper-Midwest Silvopasture Workshop

August 3 - 4, 2018 | Spring Grove, Coon Valley, WI | UW-Extension, UMN-Extension

UW and UMN Extension, with the Savanna Institute and the Kickapoo Valley Grazing Initiative will jointly host this silvopasture workshop Friday afternoon and Saturday morning including Nettle Valley Farm and Willow Creek Farm tours, small group experiences, and presentations. Participants can attend one or both days. For more details, contact Diomy Zamora at 612-626-9272 or zamor015@umn.edu.

Healthy Yards Workshop

August 10, 2018 | 9:00am-4:00pm | MU Extension Center in Greene County

This workshop will take place at the MU Extension Center in Greene County, 2400 S. Scenic Ave, Springfield. For more information, contact Kelly McGowan at 417-881-8909 or mcgowank@missouri.edu. Cost is \$40 per person.

Field Day: Agroforestry and Pollinators

September 25, 2018 | 9:00am-4:00pm | The Savanna Institute and Angelic Organics Learning Center

This field day will focus on production practices to integrate pollinator wildlife habitat with the support of USDA programs. Presentations and field tours will take place at Brattset Family Farm and Feral Farm in Jefferson, WI. More information at <http://estore.learnrowconnect.org/home/Adult-Workshops/FIELD-DAY-Agroforestry-Pollinators.html>

12th Annual Chestnut Roast

October 6, 2018 | 10:00am-2:00pm | MU Horticulture and Agroforestry Research Center

The University of Missouri is celebrating its 20th anniversary at this year's Annual Chestnut Roast. The event includes roasted chestnut samples and sales, tours of the Horticulture and Agroforestry Research Center Farm, chef demonstrations, local craft and food vendors, and activities for the whole family. The event is free and open to the public.

2nd Annual White Oak, Whiskey and Wine Tour

October 13, 2018 | 8:00am-5:00pm | University of Missouri Extension

Spend an October Saturday getting to know one of Missouri's best value-added wood products, from standing tree to finished wine or spirit. Online registration will be available June 1. Cost is \$75 per person or \$125 per couple. Contact Hank Stelzer at 573-882-4444 or stelzerh@missouri.edu for more information.



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