

green horizons

Growing tomorrow's future today.

January 2016

A newsletter from the Center for Agroforestry in
conjunction with the Forest and Woodland Association of Missouri

<http://agebb.missouri.edu/agforest/index.htm>

Volume 20 • Number 1

Mike Gold, Gene Garrett and Taylor Wanbaugh
editors

Is a Pine Straw Industry in the Future for Missouri?

Growing Pine Straw

By GENE GARRETT | *Center for Agroforestry*
DUSTY WALTER | *MU Ag. Expt. Station*

Pine straw (pine needles) is a natural product from pine trees that is used as a landscape or garden mulch in place of wood chips. While all pine trees shed their needles, all do not produce needles of sufficient length and quality (stiffness) to be baled and sold as pine straw. Minimal lengths of about 6 inches are required to bind a straw bale together.

Missouri's only native pine, shortleaf pine (*Pinus echinata*), has needles that are 3 – 5 inches and too short to bale. Likewise, non-native species found growing in Missouri, like white pine (*Pinus strobus*), are soft-needled and lack the necessary needle characteristics. Of the pines available for a pine straw industry in Missouri, a pitch pine (*P. rigida*) X loblolly pine (*P. taeda*) hybrid is probably the best option. This hybrid looks and grows like loblolly pine but is cold tolerant like pitch pine (i.e., it does not show freeze damage in Missouri). In the southern part of Missouri, pure loblolly pine selections are available that will also perform well and produce the longer needles suited for pine straw.

Planting pine for pine straw production is no different from planting trees for any other purpose. Seedlings must be planted on a site that will accommodate their needs and a spacing selected that will support fast growth, heavy needle production, and harvesting of the pine straw.

A pitch x loblolly hybrid grows well on a variety of sites from flat poorly-drained ones to relatively dry, well-drained ones. However, it grows best on moist, moderately acid soils with imperfect to poor surface drainage and a fine-textured subsoil. Slope is also an important consideration and the flatter the site the easier it is to harvest. The planting can be designed to

Baling Pine Straw at HARC



accommodate agroforestry practices, such as silvopasture and alley cropping, or consist of a square grid. Regardless of planting pattern, a minimum distance of about 12' between trees and rows is required to accommodate harvesting equipment. Weed control in the early years is also required to maximize seedling growth.

With proper management, a pitch x loblolly planting will yield sufficient pine straw to justify the first commercial harvest at age 7. Pine straw is baled in late fall or early winter and is most commonly sold in 20 lb. bales. The expected yield, once the stand is established, should exceed 300 bales/acre. Commercial harvesting is accomplished by raking the pine straw into windrows and using a standard "in-line" baler and a small farm tractor. Wholesale prices vary, but The Center for Agroforestry received \$5.50 per 20 lb. bale in 2015 for pine straw harvested from research plots. To have a healthy, productive pine straw program, healthy, vigorously growing trees must be maintained. To accomplish this, pine straw should be harvested every second or third year to help maintain organic matter and fertility levels. For every 100 bales of pine straw harvested, approximately 40 lbs. of nitrogen are lost. While fertilization needs will vary between sites, a good rule of thumb is to supplement with 150-200 lbs. of nitrogen, 50 lbs. of elemental phosphorus, and 50 to 80 lbs. of potassium per acre, every 5 years. But remember, a valid prescription can only be made following a soil and foliar

In this issue

Urban Forestry	2, 9
Forest Industry	1, 3, 10
Forest Management	4, 6, 7, 8
Agroforestry	5

Continues on page 10 >

Mulching (if done right) Benefits Trees and Shrubs!

BY JERRY VAN SAMBEEK | *Research Tree Physiologist, Northern Research Station*

Mulch, as it naturally occurs in forests, has been described as a nutrient rich, moisture absorbent bed of decaying forest leaves, twigs, and branches, teeming with fungal, microbial, and insect life. Trees and shrubs grow faster when mulched with organic mulches such as pine needles, shredded leaves, chipped landscape waste, bark, and grass clippings than when the area under the canopy is kept free of vegetation through tillage or herbicides. Studies have shown that growth of walnut and other fine hardwoods is increased on average 26 to 29 percent over that for hardwoods with bare ground beneath them. Increased tree growth can be nearly double that of trees growing in grasses or weedy vegetation (89% for walnut and 78% for other fine hardwoods).

Mulches do many other marvelous things when applied under trees and shrubs. Reports suggest that the physical effects of organic mulches are much greater than the fertilizer value associated with release of nutrients as mulches decompose. Decomposition increases soil organic matter leading to better soil health, retention of water and nutrients, and increased soil activity by earthworms, fungi, and other soil organisms. Mulches reduce both loss of soil moisture and the impact of raindrops, slow the flow of water over the soil, and increase rates of water infiltration. Mulches also moderate the soil microenvironment damping temperature fluctuations at the soil surface in addition to keeping soil temperatures lower in summer and warmer in winter than under bare ground or turf. Reducing soil temperature extremes can be important as death of tree roots commonly occurs at temperatures greater than 90°F and less than 20°F. Perhaps the best thing about mulching is that it keeps mowers, string trimmers, and other equipment away from tree trunks.

Shawn Fitzgerald, ISA-certified arborist and technical advisor at Davey Tree, provided the following five easy mulching tips in a recent blog that I have taken the liberty to expand upon.

1. Choose the right mulch. To save water in the yard and garden, use organic mulch because it breaks down and conditions the soil. Mulching is one of the most effective ways to conserve water to support tree growth--and it's also the easiest. Pine needles (sold as "pine straw") give a good bang for your buck because they retain the most moisture and suppress weeds better than any other mulch. In addition, they don't need to be replenished as often, are attractive on the landscape, create a favorable nutrient balance and are least likely to alter soil pH. Other forest fiber with a good balance of carbon to nitrogen, such as shredded leaves and hardwood bark, also work well. Fine textured mulches such as grass clippings should be mixed with other mulches to keep them from

packing and slowing water infiltration. Mulches high in carbon such as paper, sawdust, and wood shavings should be mixed with grass clippings or nitrogen fertilizers. Nonorganic mulches, such as gravel, stone, and manufactured products -- including plastic films and landscape fabrics--can block water and air movement.

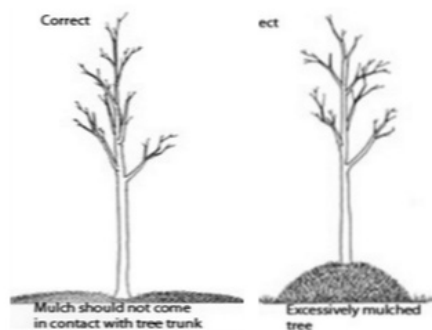
2. Ready the space. Before mulching, remove weeds from garden beds and around trees and shrubs to eliminate hours of weeding later in the season.

3. Apply mulch. For most plants and garden beds, apply 2–3 inches of mulch—not so deep as to inhibit soil aeration but still thick enough to block sunlight and minimize emergence of germinating weed seeds. If you have sandy soil, apply an additional inch of mulch. If you're mulching shallow-rooted plants, such as hydrangeas, boxwoods, or azaleas, apply a bit less.

4. Use mulch to mimic the "wild" or the natural condition found in forests. Fitzgerald says cover the plant's entire drip zone, which is as far as the leaves grow out from the trunk or stem to "mimic the wild". Doing so mirrors the forest condition and allows plants to thrive. When mulching trees, the larger the mulch ring, the greater the benefit to the tree. However, when it comes to tree growth, recent research suggests that maintaining the area along one side of a tree free of grass competition using herbicides or mulch may be as effective as maintaining the entire area under the tree canopy grass free. For newly planted hardwood seedlings, mulching a circle 4' in diameter (12 ft²) or 4' square (16 ft²) is recommended.

5. Avoid "volcano" mulching. Volcano mulching is piling mulch deeper around a tree trunk or plant stem than near the dripline which minimizes air movement into the soil and prevents deep roots from growing. Fitzgerald warns, "Volcano mulching" is one of the worst things you can do to a plant or tree." Mulch should be pulled at least 2-to-6 inches away from the tree trunk, stem, or flare so it remains dry and less vulnerable to infection by root and stem diseases. Mulches should also be pulled away from the tree trunk to minimize cover for mice and voles especially in the winter when they do the most damage.

Watch a related short video on Effective Mulching at the Davey Web site (<http://www.davey.com/arborist-advice/video/landscape-tips-effective-mulching/>).



A freshly mulched pine straw flower bed

FOREST INDUSTRY

Watching Our Trees Die: “EAB is Here Now – Are We Prepared for TCD?”

BY BOB BALL | *Woodland Landowner, Ohio*

A close friend, John, works for the Army Corps of Engineers at Alum Creek Lake north of Columbus, Ohio. He kept telling me about the devastation to ash trees caused by Emerald Ash Borer (EAB) in their 1,200 acres of park land. All of their mature ash trees at Alum Creek are now dead! Central Ohio counties have been infected with EAB for some time, but when John first started describing the damages they were seeing, my tree farm in southeast Ohio was EAB free. Or so I thought until the day John came to visit.

We were looking out over our pasture fields with stands of hardwood timber in the background when John pointed to a single ash tree left to provide shade for the cattle in one of our fields. “I thought you said you didn’t have EAB down here,” he said. It didn’t take him long to convince me many of my ash trees were either dead or dying from emerald ash borer. His visit was only a year ago. Today, I would estimate we’ve lost 80% of our mature ash trees. It may seem like an insignificant loss to woodland owners here in Missouri, but in Ohio, we have a good market for this species thanks to Ames who buy much of the ash for making tool handles. Also, Amish craftsmen make some amazing furniture pieces with ash. For us, our ash trees are a source of timber income we hate to lose.

It’s painful watching your trees die. Our home is located where we can view many acres of our hardwood timber. Every year I notice more and more dead or dying trees. Visitors who drive down our lane past our “Tree Farm” and “Walnut Council” signs have asked “why are your trees dying?” A local logging contractor looking for firewood sources for his thriving firewood business is now cutting these ash trees for his nearby clients and we benefit by improving the attractiveness of our woods. It is important that the wood only be used locally to avoid the spread of EAB!

I know the woodland landowners in Missouri share the

same appreciation for their trees as my wife and I do for our Ohio trees. But, I am concerned that they may not be able to visualize how different our Missouri forests might look without black walnut if Thousand Cankers Disease (TCD) should ever become established here. The devastation and economic loss to landowners and the state’s rural economy from the spread of TCD over time across the wooded landscape would be shocking. Remember, EAB already has a foothold in selected Missouri counties. How will everyone react and what will be the impacts if TCD should ever be discovered here as well?

TCD Threatens Missouri Black Walnut

BY HARLAN PALM | *Woodland Landowner, Missouri*

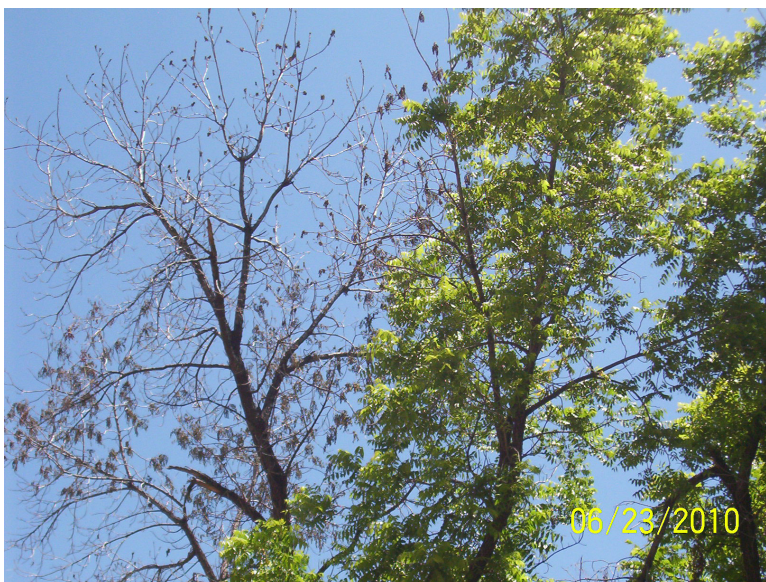
While Thousand Cankers Disease (TCD) has not yet been found in Missouri black walnut, it remains our worst nightmare. Missouri has 20% (two or more times any other state) of the walnut trees in the entire native range of the species that has been nationally valued at \$539 Billion. That

is the “standing value” of the walnut trees and does not include the derivative values of this uniquely beautiful wood in the domestic and international market chain.

Black walnut is the most valuable timber species landowners in Missouri can grow, so the loss to individual landowners could be tens to hundreds of thousands of dollars depending upon the size of acreage with walnut. Third and fourth generation families whose businesses are exclusively dependent on black walnut nut processing

or walnut wood milling could eventually have to “close up shop!” Urban parks and residential areas would face significant expense in removal of dead and dying walnut trees. It would not be a pretty sight!

TCD is spread by a tiny (1/16”) walnut twig beetle that



A Black Walnut Tree in decline as a result of Thousand Cankers Disease (TCD)

FOREST MANAGEMENT

Forest Management Can Enhance Bat Habitat

BY SYBILL K. AMELON | *Research Wildlife Biologist, U.S. Forest Service*

Forest landowners play a critical role in stewardship of wildlife resources, including bat species. Almost all North American bats rely on forests to provide the basic components all wildlife require to survive: roosting, feeding and drinking sites. Bats forage along forest edges, over riparian areas, along forest roads and trails and in natural forest gaps or management-created openings. Bats need clean, open bodies of fresh water that are large enough to enable drinking on the wing and without obstructions from vegetation.

Some forest bats roost exclusively in the foliage of living trees; these are often referred to as “tree bats”. Other species roost under loose, peeling bark or in crevices of dead or damaged trees. Forest-bats, especially maternity colonies, move frequently between roost trees. This roost switching may be an effort to avoid predators or parasites or to seek a warmer or cooler roost. For snag-roosting bats, switching could also be tied to the temporary nature of dead and dying trees. If a roost tree becomes unstable or falls, the bats will already know of an alternative roost. It is not uncommon for bats to return to the same roost tree or group of trees in the same patch of forest in successive years.

White-nose syndrome (WNS), a recently emerged disease affecting bats that hibernate, is associated with the fungus *Pseudogymnoascus destructans*. This fungus grows in relatively cold conditions with high humidity, which makes many caves, abandoned mines, and other underground structures optimal growing sites for the disease during winter. Of the six species known to be affected by the deadly bat-disease, the northern long-eared bat (*Myotis septentrionalis*) is among the hardest hit with reported declines of 98 percent. Given that white-nose syndrome has already spread to 25 of the 39 states where the northern long-eared bat is found,

it's clear the future existence of this bat is very much in doubt. Northern long-eared bats were recently listed as threatened under the Endangered Species Act joining Indiana bats (*Myotis sodalis*) and gray bats (*Myotis grisescens*) (both ESA listed Endangered) under Federal protection. The northern long-eared bat is about three-to-four inches long with a nine-to-ten inch wing span. As its name suggests, it is distinguished by its long ears, relative to other bats in genus *Myotis*. In summer, these bats roost under bark and in crevices

and cavities of living or dead trees that are often larger than the average diameter trees. Maternity roost sites must provide warm microclimates that maximize growth rate of the young.

Bats play an essential role in maintaining forest health by consuming their body weight in insects each night. As major predators of defoliating forest and agricultural insects, bats provide an estimated \$23 billion/year benefit to agriculture. Forest-management practices such as harvesting or prescribed burning

can have positive or negative effects on bats by altering the distribution and abundance of living and dead trees used for roosting or the number of forest openings and edge habitat used for foraging. Forests can be successfully managed for both wood products and bat habitat, as long as adequate roosts, foraging habitat and water sources are provided across the landscape.

Forest-management is a wise investment in America's forests and management practices that improve forest health and productivity can also maintain and enhance habitat for these fascinating and beneficial animals.



Northern long-eared bat

AGROFORESTRY

Forest-grown Mushrooms for the Woodland Owner

BY GREGORY O. MORI | *Education and Outreach Coordinator, Center for Agroforestry*

If you are a woodland owner or you run a small farm with a woodlot, growing mushrooms might be the right thing for you. Whether for commercial sale or personal use, cultivating forest-grown mushrooms in an agroforestry practice known as forest farming, can be an attractive and enjoyable activity.

As a woodland owner, it is always recommended that you develop and follow some form of forest management plan. Such a plan very likely will involve timber stand improvement (TSI), regular thinning of undesirable trees and occasional harvests of saw-grade timber. The low-grade and small diameter trees thinned from woodlots as well as branch-wood from tops of harvested saw-timber trees are often an ideal size to use for mushroom cultivation. Thus, it is possible to integrate a mushroom growing operation as part of an overall forest management program.

Mushrooms are the “fruiting bodies” of certain kinds of fungi. Many fungi obtain their food (energy and nutrients) from decaying organic matter like dead wood. These are called “saprophytic” fungi. The mushroom that you see is the “fruiting body” which is connected to unseen mycelium (tiny thread-like vegetative body of the fungi) growing in the dead wood. The mushroom is the site where spores are produced and released.

Some of the mushrooms that can be grown in a Forest Farming operation (one of five agroforestry practices) include: Shiitake, Oyster and Wine-cap (King Stropharia). Other lesser known and somewhat more challenging mushrooms to grow in a forest farming operation include: Lion’s Mane, Reishi and Hen-of-the-Woods (Maitake). Besides being delicious and highly nutritious, many of these mushrooms command high prices at farmers markets and gourmet food establishments and can be the basis of a commercially viable forest farming operation. Through on-farm research, a Cornell University study found that growers can be profitable in year two and net \$9,000 over a five-year period with a 500-log operation.

Becoming “profitable” however, is relative and depends on how efficiently an operation is designed coupled with access to adequate markets.

The basic growing techniques such as log inoculation, totems or wood-chip beds are relatively easy to learn, for either the backyard hobbyist or a commercial grower. You don’t need much to get started, especially if you only plan to grow mushrooms for your own enjoyment. You will need access to some logs and a shady spot, some mushroom spawn and some basic equipment. A normal cordless drill can be used, but if you will be working with more than a few logs, investing in a high speed drill will make the job go much faster. White oak and sugar maple logs work best for Shiitake, but other species such as sweet gum work well too. Generally, just about any, “soft” hardwood such as cottonwood or elm works great for oysters (as do many other substrates like straw, woodchips - even coffee grounds and rolls of paper). Wood chips of almost any deciduous tree species, mixed with straw, will provide Wine-cap mushrooms what they need to grow.

Generally, spores are not used in mushroom cultivation, instead logs or other growth substrates are inoculated with “spawn.” Spawn consists of some sterilized growing medium (whether sawdust, grain or wooden dowel plugs) that has been colonized by a known and reliably producing strain of the mushroom (fungi) you are interested in growing. While it is possible for growers to produce their own spawn, until one has sufficient experience and adequate equipment and conditions, it is best to purchase spawn from a reputable supplier. Commercially available spawn comes in the form of plugs, sawdust or grain spawn. Plug spawn can be driven into drilled holes with a regular hammer. For sawdust spawn, a special inoculating tool is required that costs about \$30.

Is mushroom growing for profit the right thing for you?

While growing common species such as Shiitake, Oyster or Wine-cap, is relatively

easy to do, even for the backyard hobbyist, doing so profitably as a commercial mushroom growing venture, like most farming enterprises, presents many challenges.

Adequate planning, a market survey and a thorough analysis of whether mushroom growing is right for you and your land is essential before diving in big. To get started as a hobbyist and learn “how” to grow mushrooms, there are many resources and grower guides available on-line (see links below). For launching a new enterprise, seek appropriate technical guidance from your local extension agent or other expert and do your homework before initiating a new commercial venture or introducing a new specialty crop into your farming operation.

<http://extension.missouri.edu/explorepdf/agguides/agroforestry/af1010.pdf>
<http://farmingthewoods.com/>
www.fieldforest.net



Golden Oyster Mushrooms fruiting on a hackberry trunk 4 months after inoculation with sawdust spawn in a chainsaw incision.

Photo by David Davies, University of Missouri Forage Systems Research Center, Linneus, MO

FOREST MANAGEMENT

Growing Valuable Hardwoods: Broadening the Focus for Walnut Council

By DENNIS EVANS | *President, Missouri Chapter Walnut Council*

Changes in markets and the priorities of Missouri landowners have prompted the local chapter of the Walnut Council to begin a makeover of how to improve assistance to our members. Responding to the growing demand for white oak and other valuable hardwoods, our Missouri chapter now offers landowners information on how to manage their woodlands effectively. Chartered in 1970 to encourage planting, growth and management of black walnut, this non-profit organization is evolving. “We’re not just about black walnut anymore”, says Scott Brundage, certified forester and past president of the national Walnut Council. The local chapter provides technical information to its members and organizes at least two field days every year where experts demonstrate how to care for and manage trees. The chapter is ramping up its outreach to encourage landowners to plan now for greater reward and enjoyment of their woodlands.

Missouri is the center of the native range for growing black walnut (*Juglans nigra*), and the state has the largest population of walnut with an estimated 57 million trees five inches and larger in diameter. The National Woodland Owner Survey also tells us there are 212,000 people in Missouri owning 10 or more acres of woodlands. Only a percentage of those landowners have black walnut growing on their land, and fewer and fewer of them actually live on their farms. The Survey indicates that people care about managing their trees properly and passing healthy woodland operations along as a family legacy. Selling timber is not a priority for everyone. The goal of our family’s forest is to grow the largest quantity of high quality trees in the shortest amount of time. But, I also enjoy the beauty and scenery, including expanding wildlife habitat, and going to the woods for family gatherings and hunting. For some, selling timber becomes a means of generating needed dollars for paying medical expenses, funding a college education or paying down indebtedness. Knowing what your goals are is a first step towards becoming more actively involved in the management of your woodlands.

As a member of the Walnut Council, I’ve avoided mistakes and improved my woodlands by talking to professional foresters, reading scientific research and listening to the personal experiences of other landowners like me. You can receive more dollars for your timber if your trees are actively managed. Timber production may not be your primary goal, but regardless of your objectives, a woodland

management plan is a “must-have” document. We know from the Survey that only 7% of Missouri woodland landowners have forest management plans! Walnut Council helps connect landowners to experts who can help you write and implement management plans. Most of our members own parcels of forest totaling 40 to 400 acres, but we also work with weekenders with smaller hobby farms. A “landowner-centered” organization, we offer hands-on management field days and workshops all around Missouri. During field days, you would find us standing in the woods discussing the control of less than desirable species or pruning a crop tree during a timber stand improvement (TSI) demonstration.

The Missouri Chapter Walnut Council “Action Plan” identifies tasks to move us closer to attaining our new mission: “We encourage the management of privately owned forest resources in Missouri”. This begins by reaching out to woodland landowners, land managers and consultants, both private and government technical specialists, and the forest products industry. We are examining the content of our past field days and workshops thinking about important topics we may have overlooked that could better meet the needs of our clients. Our chapter website will be upgraded and a new membership brochure is on the horizon listing assistance available through the chapter. We hope to soon offer discounts with major nurseries and possibly incentives from consulting foresters for their technical services.

Walnut Council members include landowners, foresters, forest products industry representatives, university faculty, university extension staff, state and federal agency foresters, soil scientists, business owners, and wildlife management experts. A new chapter member, retired biochemist Michael Williams, stated, “Walnut Council is a living how-to book of forestry in Missouri.” Our members and contacts know about tree planting, weed control, pruning, herbicides, timber contracts, timber prices, dealing with loggers, timber taxes, managing for wildlife, insects, woody invasive species and tree diseases including white oak decline, emerald ash borer (EAB) and new threats like Thousand Canker Disease (TCD) of black walnut. We also discuss and demonstrate the equipment needed for timber stand improvement and safety practices. We publish a quarterly newsletter and frequent technical articles with access to out-of-state experts through our national organization.

Want to know more? You can email us at: mowalnut-

Continues on page 7 >

'Growing Valuable Hardwoods'

Continued from page 6

council@gmail.com, call 417-658-8475, or follow us at: <http://www.walnutcouncil.org/state-chapters/missouri.html>. Our spring meeting with field tours is tentatively scheduled for April 1-2, 2016. Join us in the field to learn more about how to manage the woodlands that we all love!



Fred Crouse, consulting forester, providing forest management tips

The Bid Box By HANK STELZER | MU Forestry Extension

BOONE COUNTY, MO

55 acres

588 mixed hardwoods

Doyle tree scale used, 93,500 bd. ft.

50,800 bd. ft. white oak

23,600 bd. ft. red oak

12,500 bd. ft. black oak

3,800 bd. ft. walnut

2,800 bd. ft. other mixed

hardwood species

Forester valued sale: \$25,300

5 bids:

\$31,576

\$31,165

\$28,250

\$24,000

\$15,730

Landowner took high bid

Return: \$574/acre

CHARITON COUNTY, MO

83 walnut trees scattered through approximately

35 acres along creek banks

Doyle tree scale used, 20,000 bd. ft.

14,000 bd. ft. grade lumber

2,000 bd. ft. three sides clear

4,000 bd. ft. veneer

Forester valued sale: \$35,000

9 bids:

\$41,085

6 ranged from \$32,580- \$36,890

\$23,000

\$19,000

Landowner took high bid

Return: \$1,174/acre

In the Chariton County walnut sale, the forester selected trees with the intent to harvest additional trees in 5 to 10 years. This shorter re-entry interval is possible because of the extremely fertile creek bottoms where these walnut trees are growing enhancing good tree growth. He marked mature trees greater than 24 inches; any tree that was getting undercut by the creek and risked falling; any tree with defects prohibiting an increase in value in spite of increasing volume; and any lower quality trees that could be removed to reduce competition for the better quality trees being left to grow.

There are still a good number of 16- to 22-inch DBH walnuts left. Had they been harvested now, they would only yield lumber-grade prices. By allowing them to grow, many of these trees will command the higher veneer prices in the next sale.

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!

FOREST MANAGEMENT

Returning Fire to Forest Management Part 1: History and the Rub

By MICHAEL C. STAMBAUGH | *Res. Asst. Prof., Forestry, University of Missouri*
DANIEL C. DEY | *Research Forester, U.S. Forest Service*

Think about the vast changes in technology, economics, and communication that have occurred during the last century. Changes in forest management have also occurred including perspectives on, and use of fire. Recently, natural resource professionals have begun to realize that fire can be beneficial when used carefully to meet specific objectives. As with any change, it may be difficult for some to understand why fire use is being promoted and how to judge its benefits and costs. This article is part 1 of 3 that addresses emerging issues related to fire and forest management. To do this, we will report on the history of fire, challenges & opportunities in fire use, and potential future directions related to fire and land management.

Fire History

Fire is a chemical reaction that has been occurring on earth since the appearance of plants. Through time, many plants and animals have become adapted to, or dependent upon, fire to survive. In the Midwest, fossil charcoal records that extend back to the last glaciation show evidence of recurring fires, including its presence in upland forests. Lightning-caused fires are uncommon in the Midwest, so humans are considered as the primary source of fire for thousands of years.

There are dozens of reasons why humans burn vegetation to “manage” land including: hunting, site preparation and management for crops (both native and domesticated), improving growth and yield of plants, fireproofing areas, cooking, felling trees, clearing land for travel, warfare, signaling, etc. Fire was so pervasive in the past that you would not recognize familiar places if you could turn back the clock 100 years or more.

Fire was the primary factor that created the types, locations, and conditions of forests that were first encountered by European settlers and, like the Native Americans, early European settlers lived off the land in a system of subsistence based on livestock and crop production using fire to manage land for their benefit. During settlement, forests may have burned more frequently than grasslands because

more forage for livestock was needed than was available. Due to massive wildfires in the early part of the 20th century due to large scale forest mismanagement, beginning around the 1930s, great efforts were made to stop burning by state and federal agencies. By the 1950s, burning in forests had essentially ceased. Stopping forest fires resulted in a loss of knowledge of managing land with fire. Today, society’s knowledge of fire is less essential. Many of the goods and services provided by fire in the past have been

repackaged and are now provided by stove tops, heaters, and combustion engines. However, suppressing fire has caused dramatic changes in forests throughout the United States. Due to the lack of fire, many species and forest types have been diminished or lost. States like Missouri are more heavily forested than they were 150 or more years ago. Most alarming is that oak and hickory forests are declining throughout the eastern U.S. Scientists attribute this broad decline to the lack of disturbance, particularly to the lack of fire. In response, there is increased interest in understanding how to return fire to forest management... but there is a rub.



Photo credit: M. Stambaugh, February 2013 prescribed burn in a forest dominated by large white oaks.

The Rub

Forest values have changed over time.

The values that Native Americans and European settlers had are not the same as today’s values. Though some values have remained the same and are still enhanced by burning, others can be diminished, such as commercial timber value and production – and here lies the rub. Fire disturbance is needed, but may not align with all of the values placed on present day forests. The challenge is to re-learn fire management and determine how the use of fire can be placed back into forest management to enhance certain values while minimizing the negative effects on others.

For more information about fire science and management, visit Oak Woodlands & Forests Fire Consortium webpage at www.oakfirescience.com, or, stay tuned for the next two issues of Green Horizons.

URBAN FORESTRY

I Won't Live Long Enough to Worry About It

By EUGENE L. BRUNK | *Retired Forester*

One of the most common explanations I've run across, from a person planting the wrong tree species or planting a tree in the wrong place, is this, "It doesn't matter, I won't live long enough to worry about it." I always get the impression that these type folks either don't expect to live very long, or don't believe that trees can grow very fast. They definitely don't have much consideration for future owners of their property. I could understand their attitude, if they were uninformed about their species selection and/or the limitations of the place where they want to plant that particular tree. Uninformed people make mistakes every day, about lots of things. I've done it myself.

However, many of the folks who use the excuse noted above, do so after they have been informed by knowledgeable people, and even after being advised as to the proper action they should take to accomplish their need to plant a tree, or trees, around their home site.

I once had an acquaintance ask me what he should plant in a certain spot near his house. I looked it over and realized he didn't really have much room for a large tree to develop there, so I recommended a dogwood or redbud, or some other species that wouldn't "outgrow" the spot. I tried to explain all the ramifications of right tree in the right place, and actually recommended that he consider some sort of shrub, if he really needed some kind of perennial plant in that spot. He thanked me for my time and advice, and I went along my way thinking I had done my good deed for the day.

About a week later, I saw my friend planting a tree in "the spot," so I stopped to observe his technique. It was good, but he was planting a pin oak! in a spot that would barely hold a redbud when the tree matured! When I asked him why he was planting a pin oak, he said, "my wife always wanted a pin oak". I reiterated the limitations of the spot, and he gave me "the excuse", "I'll be gone before it causes any problems. Guess what? 8 years later he was still around, and the pin oak was beating up on his siding and had broken an outdoor light fixture. What to do? Cut it down and replace it

with a shrub." "I can't do that, it's my wife's pin oak." I went on my way.

Examples like this abound. Many years ago, a fellow forester recommended a redbud or dogwood to his father-in-law for a spot in his postage stamp-sized backyard in St. Louis. When my colleague returned, there stood a pin oak. Why had his in-law planted it? It was on sale at the local parking lot retailer, and besides he wouldn't live long enough to worry about it. He was still alive, and the tree dominated his and two other backyards after 30 years.

Many lay people believe that trees don't grow very fast. In some cases that is true, especially where they experience poor soil conditions or other adverse circumstances (drought, fire damage, etc.). However, many species of trees can survive and grow well in a variety of urban settings, if they are given half a chance, and can become larger than their rural woodland counterparts, in the same amount of time, due to less competition from other species. Even growing at a very modest rate of 1.5' per year, your tree will be over 20' tall in 15 years (many grow much faster).

So, when planning for the right tree in the right place, take into account that, if you are healthy enough to plant a tree now, you will probably live long enough for it to gain some size, and let that temper your thoughts about where to plant that favorite tree. In addition, it will make your property more desirable to a prospective future owner (and more valuable to you).

‘EAB is Here’

Continued from page 3

carries the spores of the fungal organism that causes the cankers (TCD) under the bark. Thousands of these small cankers disrupt the movement of nutrients in the tree and overwhelm the tree’s defenses leading to decline and death. While the insect vector is believed to advance the infestation only a mile or two per year, it is humans that can inadvertently spread the disease hundreds of miles by moving infested firewood, logs or pieces of walnut logs with bark attached that have not been kiln dried or sanitized. Look, for example, at the rapid spread of the Emerald Ash Borer throughout the Midwest, which is in large part due to movement of infested wood, especially firewood, and not the dispersal of adults seeking new trees to infect.

Landowners can help guard against TCD becoming established in Missouri. To learn more about this disease visit <http://mdc.mo.gov/your-property/your-trees-and-woods/tree-diseases-and-pests/thousand-cankers-disease> or view a TCD brochure at: http://mdc.mo.gov/sites/default/files/resources/2011/01/tcdupdate4_13.pdf

There are several references with photos of symptoms to look for and who to contact for assistance. If you see declining walnut trees, especially a stand of trees with wide variation in amount of decline, take some photos of the stand, individual trees and declining areas of the tree crown, and submit them. We have pathologists and entomologists that are more than willing to look at the photos and decide if an arborist should be sent to examine the trees.

A Missouri Invasive Forest Pest Plan and a TCD Action Plan have also been prepared to provide a coordinated response to invasive pests in Missouri forests and to TCD in particular. Please note that these plans are two separate documents that are available on the MU Extension “Tree Pests” home page at: <http://extension.missouri.edu/treepests/home.aspx>

‘Pine Straw’

Continued from page 1
analysis.

While pine straw is a new forest product in Missouri, our state has vast acreages that would support pine straw plantings. With increased acres planted, current markets will expand and new markets will develop. There was a time, in the southeastern U. S., when pine straw was not available commercially and landowners hand-raked it for their strawberry plants to reduce weeds and conserve soil moisture. Today, in Georgia alone, pine straw is nearly a \$100 million/year industry. The pitch x loblolly pine hybrid provides a unique opportunity for Missouri to also become a pine straw producing state. For additional information contact the Center for Agroforestry, Forestry Department, University of Missouri, Columbia, MO 65211.



Area covered by a 15 lb. bale of Pine Straw mulch vs. a 2 cu. Ft. bag of Cyprus mulch



green horizons

editorial board

Mike Gold, Research Prof., co-editor
MU Center for Agroforestry

Gene Garrett, Emeritus Professor, co-editor
MU Center for Agroforestry

Taylor Wanbaugh co-editor
MU Center for Agroforestry

Joe Alley, Resource Conservationist
NRCS, MO SAF

Scott Brundage, Consulting Forester

Eugene L. Brunk, MDC Retiree

Donna Coble, Executive Director
Forest ReLeaf of Missouri

Lynn Barnickol, Executive Director,
Missouri Consulting Foresters Association

Shibu Jose, Professor, Director,
MU Center for Agroforestry

Rebecca Landewe, Current River Project
Manager
The Nature Conservancy – Missouri

Francis Main, chair,
Missouri Tree Farm Committee

Dennis Evans, chair,
Missouri Walnut Council

Steven Westin,
MDC Private Land Forestry Programs

Clell Solomon,
Mo. Christmas Tree Producers Association

Hank Stelzer, Professor
MU Forestry Extension

Robert Stout
Mo. Department of Natural Resources

Kim Young, Vice President/General Manager
Forrest Keeling Nursery

Bob Ball, Woodland Landowner

CONTRIBUTORS



Missouri Chapter
Walnut Council



MU School of Natural Resources
College of Agriculture, Food and Natural Resources

Contact Green Horizons

Send story ideas, address
changes and subscription requests
for Green Horizons to:

Mike Gold, Gene Garrett
Green Horizons
University of Missouri
203 ABNR
Columbia, MO 65211

goldm@missouri.edu | (573) 884-1448
garretth@missouri.edu | (573) 882-3647

Issued in furtherance of Cooperative Extension Work Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Dr. Michael Ouart, Vice Provost and Director, Cooperative Extension, University of Missouri, Columbia, MO 65211. University of Missouri Extension does not discriminate on the basis of race, color, national origin, sex, sexual orientation, religion, age, disability or status as a Vietnam era veteran in employment or programs. If you have special needs as addressed by the Americans with Disabilities Act and need this publication in an alternative format, write ADA Officer, Extension and Agricultural Information, 1-98 Agriculture Building, Columbia, MO 65211, or call (573) 882-7216. Reasonable efforts will be made to accommodate your special needs.



The Center for Agroforestry
University of Missouri

A Global Center for Agroforestry, Entrepreneurship and the Environment

green horizons

The Center for Agroforestry at the University of Missouri
203 Anheuser-Busch Natural Resources Bldg.
Columbia, MO 65211

Calendar of Events

Midwest Conservation Biomass Alliance Annual Meeting

January 27, 2016

8:30-5:30 p.m.

Room 204 Memorial Union South University of Missouri, Columbia, Mo. RSVP by January 15 to Carol Williams williams-carol@missouri.edu

Agroforestry Symposium, The Future of Pollinators: Why Agroforestry Matters

January 28, 2016

8:30 a.m.-4 p.m.

Monsanto Auditorium, Bond Life Sciences Building University of Missouri, Columbia, Mo. http://www.centerforagroforestry.org/events/2016_SymposiumProgramFlyer.pdf

Missouri Natural Resources Conference: Balancing Economics, Conservation and Adaptive Management in a Changing World

February 3-5, 2016

Tan-Tar-A Resort, Osage Beach, Mo. <http://www.mnrc.org>

Missouri Organic Association Annual Conference

February 4-5, 2016

Springfield, Mo. <http://www.moaconference.org/>

Missouri Walnut Council Spring Meeting

April 1-2, 2016

New Florence, Mo. Contact Harlan Palm for details (PalmH@missouri.edu)