



# Kentucky Woodlands Magazine

Volume 4 Issue 2  
August 2009

**Wildfire and Woodlands**  
**Kentucky's Forestry Industry**  
**Emerald Ash Borer is Here**

# Kentucky Woodlands

Volume 4 Issue 2 Magazine

*Promoting stewardship and sustainable management  
of Kentucky's non-industrial private forests.*

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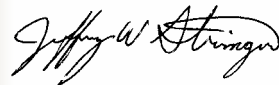
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## *From the Editors of the Kentucky Woodlands Magazine:*

Unfortunately, 2009 has been a banner year for natural disturbance and economic disruption. Many Kentucky woodland owners have experienced unprecedented ice damage, wind storms, flooding, and a new insect outbreak. When these disturbances hit hard they can generate a significant amount of tree and woodland damage. As if this wasn't bad enough, the majority of this damaged timber has been left to rot due to the depressed timber markets. All of this dead material represents a fire hazard and there are some areas of Kentucky and some woodland owners that have to deal with extremely dangerous situations relative to forest fires. "Wildfire and Woodlands: Assessing and Reducing Risks" provides some useful information on assessing the risk of fire hazard in your woods based on the amount and distribution of fuels and offers recommendations on how to reduce your risk.

The economic downturn has taken its toll on our wood industry, from loggers to cabinet shops. See the article entitled "Kentucky's Forest Industry-down but not out" for an up-to-date overview of our wood industry. And if you have not heard, Emerald Ash Borer was found in the Bluegrass Region of Kentucky and a quarantine was put in place this summer in an attempt to slow the infestation. Details of the quarantine are outlined in this issue.

We hope, despite the less than ideal news that you enjoy and can use the information in this issue and we can all look forward to a time when conditions change for the better.



**Jeff Stringer,**  
University of Kentucky  
Department of Forestry



**Diana Olszowy,**  
Kentucky Division of Forestry

### **About the Cover:**

The Kentucky Division of Forestry contributed the cover image of a wildfire in eastern Kentucky. The image should remind us that the fall forest fire season started October 1 and runs through December 15. Unfortunately, wildfire is a reoccurring issue in Kentucky that not only damages our woodlands but requires significant resources and puts firefighters in extremely dangerous situations. Be sure to check out the article on page 1 on Wildfire and Woodlands to learn how you can assess and reduce the risk of wildfire on your woodland property. To report arson call the Target Arson Hotline at 1-800-27-ARSON. *Back cover photo courtesy: Lakshmi Sridharan, bugwood.org*

#### **Managing Editors:**

**Jeff Stringer**  
Cooperative Extension Service  
University of Kentucky  
Department of Forestry

**Diana Olszowy**  
Kentucky Division of Forestry

#### **Associate Editor:**

**Billy Thomas**  
Cooperative Extension Service  
University of Kentucky  
Department of Forestry

**Assistant Editor,  
Advertising & Graphic Designer:**

**Renee Williams**  
Cooperative Extension Service  
University of Kentucky  
Department of Forestry

**Proofreading and Web Support:**  
University of Kentucky  
Agricultural Communications Service

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#### **Change of Address and Other**

**Magazine Business:**  
Forestry Extension Office,  
Department of Forestry,  
University of Kentucky,  
216 Thomas Poe Cooper Bldg.,  
Lexington, KY 40546-0073  
859.257.7597  
E-mail: [billy.thomas@uky.edu](mailto:billy.thomas@uky.edu)  
[www.ukforestry.org](http://www.ukforestry.org)

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Forestry Extension Office  
Department of Forestry  
216 Thomas Poe Cooper Bldg.  
Lexington, KY 40546-0073  
859.257.7597  
[www.ukforestry.org](http://www.ukforestry.org)



Kentucky  
Division of Forestry  
627 Comanche Trail  
Frankfort, KY 40601  
502.564.4496  
[www.forestry.ky.gov](http://www.forestry.ky.gov)

Photo courtesy: Thomas Barnes - Sassafras and back cover leaf





# WILDFIRE AND WOODLANDS

## ASSESSING AND REDUCING RISKS

*by Jeff Stringer*

All woodlands, to one degree or another, are at risk of being damaged by a wildfire. Fortunately, it is possible to assess woodlands for the risk of wildfire occurrence and the degree of damage that might occur. This assessment allows plans to be made that are effective in reducing the potential harm to woodlands from wildfires.

### FIRE SCIENCE AND BEHAVIOR

It is helpful to understand some of the facts associated with how wildfires start and spread and the science and behavior of wildfires. While this is a complex subject, there are some basics that can be easily explained, and once understood, they are very helpful in assessing risk and implementing practices to reduce damage to trees and woodlands caused by wildfires.

In order for a wildfire to start, there has to be fuel present that can easily ignite. In Kentucky, the easily ignitable fuels are dried leaves from hardwoods or needles from pines. Dry conditions with abundant ignitable fuel on the ground occur directly after leaf fall, in late October through December, and again in late February through April. Once new leaves emerge, shade is on the ground, the humidity in the woodlands increases, and the leaves become hard to ignite. The periods cited above are when leaves are exposed to sunlight and signal Kentucky's wildfire hazard seasons. Laws are associated with outdoor burning at these times (see page 4). It takes only a small amount of warming and wind at these times of the year to dry the surface of the leaves so that they can easily ignite. This drying occurs quickly on south- and west-facing slopes compared to areas that are shaded, such as north-facing slopes, coves and hollows, and areas directly adjacent to streams.

While a patch of dry leaves can easily ignite, a fire can spread if there is an unbroken distribution of fuel throughout the woodland. Unfortunately, after leaf fall most woodlands

are left with a continuous blanket of fuel. This continuity of fuel allows a wildfire to spread quickly across the ground, encompassing the entire woodland. Fires fueled solely by leaves or other fuels on the forest floor are termed ground fires, compared to those in the western United States, where entire conifer trees catch on fire and the fire spreads through the canopy as well as along the ground. How fast a ground fire moves and its heat and intensity relate to how much fuel is present, how dry the fuel is, air movement, and landscape position. While leaves (or needles) are the ignitable fuel, twigs, branches, and logs are also fuel. The more there is of this type of woody debris, and the drier it is, the greater the potential for intense fires. More will be said about this later. Relative humidity and rainfall are what controls the moisture of the fuel, whether it is leaves or branches. Of course, leaves dry quickly when subjected to low humidity, followed by larger fuels such as twigs, branches, and finally logs or large tree stems. The longer the dry spell, the more the larger fuels dry out and the more easily they are ignited, which can contribute significantly to increasing a fire's intensity significantly (see *Kentucky Woodlands Magazine* December 2007, Vol. 2 [3]).

Moving air fans flames and creates more intense fires. We normally consider air movement as wind, and certainly wind can create hotter and faster moving wildfires. However, fires also create their own air movement. As hot air rises from the front of a wildfire it "sucks" air in behind it, creating air movement. This air movement fans the flames. This is very noticeable on steep terrain if a fire gets started at the bottom of the hill. As the fire naturally moves uphill, the air currents flow in the same direction as the fire's movement accelerating the fire as it moves up the hill, increasing its intensity, and resulting in conditions at the top that can be lethal to trees, shrubs, and understory.

*Photo courtesy: Kentucky Division of Forestry*

## WOUNDING TREES

Regardless of size, all trees can be wounded from fires. Once the inner bark heats to approximately 140°F for a very short period of time, the living cells can die, resulting in an open wound that lets rot fungi into the tree. Years later, the result is a hollow tree. Most of our species do not have bark thick enough to ward off internal heat buildup. On slopes, forest fuels such as, leaves, twigs, and branches can accumulate against the bottom of a tree on the uphill side. Such added fuel allows fire to linger at the base of a tree. In addition, the uphill side of the tree is shielded from the wind generated from a fire moving up a hill, thus allowing heat to build up. Both of these conditions combine to produce the basal wounding that is common on the uphill side of trees on steep slopes that have burned (see photo to right).



Photo courtesy: Chris Reeves

## HOW FIRES START

The majority of wildfires in Kentucky are started by people due to accident, ignorance, or unfortunately, arson. This is in contrast to the western United States where lightning is the primary culprit responsible for wildfires. Embers from debris and trash burning and cigarettes can easily start fires. Stopping debris and trash fires is a matter of following the burning laws, burning in evenings and attending the burn, and using common sense. Arson fires are purposefully set, often times from an inconspicuous public road or woodland trail or road, some place with easy access and out of sight. Knowing these locations relative to a woodland property is helpful in planning to reduce risks.

## ASSESSING RISK

First, all woodlands are at risk, because a fresh ignitable fuel source is generated every year during leaf fall. Having steep slopes that are south and west facing increases the possibility of a fire ignition and spread. Ground fires can be low intensity and slow, as for example when a fire is creeping down a hill. Or, ground fires can become very intense when they move uphill. However, neither type of ground fire can happen unless there is an ignition. Access to woods from a public road on the edge of the property or from trails running through the woods, represent an ignition risk. Knowing the topography and the ignition risks allows you to plan on where wildfires might occur. Identifying wildfire control practices should be included in your management plan or stewardship plan for these areas.

The amount and type of forest fuel must also be assessed to determine risk. As stated earlier, the primary fuel for wildfires in Kentucky is leaf litter. However, wind and ice storms can often create a significant amount of larger fuel on the ground. Occasionally, insect and disease outbreaks can kill a patch of trees that can contribute to ground and standing fuel. A branch here or there is generally not an issue. Extreme risk occurs when twigs and branches cover the entire woods, forming a continuous mat of fuel. Once the leaves ignite, branches can also ignite if they are dry and produce a hot fire that spreads across this fuel source, creating enough intensity to kill or severely wound even large trees. Assessing debris buildup is important where storms or insects and disease have deposited large fuels on the ground. The photos below provide



**1: Minimal risk, leaves are only fuel.**



**2: Moderate risk, leaves and scattered large fuels.**

Photos 1,2, and 3 courtesy: "Photo Guide for Predicting Fire Risk to Hardwood Trees during Prescribed Burning Operations in Eastern Oak Forests" in U.S. Forest Service General Technical Report NRS-44 by Dr. Patrick Brose.

examples of stands and trees at varying degrees of risk for fire damage based solely on fuel amount and distribution.

## REDUCING RISKS

Reducing fire risk involves determining areas that are at risk and developing and implementing a proactive plan to reduce that risk, which should be included in your management plan. Professionals from the Kentucky Division of Forestry can help to develop an effective wildfire management plan. This plan will typically involve the following practices:

- Determining potential ignition points and close off any roads or access to the property (if possible) during fire season.
- If not already in place, developing a good road infrastructure so those areas rated at moderate to high risk can be reached by a vehicle.
- Planning a fire lane system. This system can include the use of existing woods roads or trails and might include developing some more. Fire lanes are strategically placed to allow:
  - the setting of back fires to reduce fuels directly in front of an oncoming wildfire
  - development of a controlled, proactive burn strategy
  - reduction of fuels before a wildfire occurs
  - a place that can be easily reached to set up a fire line in the event of an ongoing wildfire.
- Prior to and during fire season, make sure that leaves and any other forest fuels are cleared from the fire lanes and woods roads. Leaves can be cleared with a blower, and disking can be used to ensure bare ground after leaf fall. This breaks the continuity of fuel, thus stopping or slowing the spread of fires.

- In moderate or high risk areas, a wildfire buffer zone could be developed near ignition sources or around areas in the woods that need special protection. In the buffer zone, develop and implement a plan to reduce fuels. A well-timed, controlled burn could possibly be used to reduce leaves and larger fuels. Large fuels such as branches, limbs, and tops should be removed from the buffer or managed so that this type of fuel is on the ground. Such management can be accomplished using a slash treatment, cutting branches and other woody material into small pieces so they are resting on the ground, or by running them over with a bulldozer. Getting these types of fuels on the ground helps keep them from drying out quickly and hastens their rotting. Branches, limbs, and tops that are off the ground dry quickly and become ignitable in much less time than fuel that is on the ground.

Along with developing and implementing a wildfire plan, there are steps that can be taken to help protect woodlands. It is prudent to know the contact information for alerting the proper agencies in case of a wildfire (see page 4). Cease debris burning and other practices that could cause ignition, discuss debris burning and other sources of ignition with your neighbors, and report unlawful burning during fire seasons. During fire seasons, alert the Kentucky Division of Forestry to make its staff aware of the location of your woodlands and that you are concerned about protecting them. The inset provides specific information on Kentucky's wildfire seasons and how to obtain information to help protect your woodland, homes, and property in the woods.

Remember that it's too late to start to worry about a wildfire damaging your woodlands as it rolls up the hill. Start protecting your woods now by assessing risk and developing and implementing a protection plan.



**3: High risk, leaves, scattered heavy fuels.**



**4. Extreme risk, heavy fuel 4 to 5 feet off the ground and continuous across the stand.**

*Photo 4 courtesy: Diana Olszowy, Kentucky Division of Forestry*

The overall risk of fire occurrence and damage for an individual tree, stand, or entire woodland is based on a combination of factors including topography (land form); type, abundance and distribution of fuels; and the presence or absence of an area where ignitions are likely to occur. While all of these factors can occur in a large number of combinations, the table on the right provides a rating for the risk and occurrence of wildfires for some common situations in Kentucky.

Rating for Risk of Wildfire Occurrence and Damage								
How To Use								
To determine the fire danger rating for a stand or an entire woodland find what conditions apply most to your situation as indicated by the Xs. For example, if a stand in your woodland is on a moist facing slope, has scattered branches, and roads and trails are present, then the danger rating is Low.								
Fire Danger Rating		Conditions						
		Land Form		Fuel			Ignition Areas	
		Moist	Dry	Leaves	Leaves with Scattered Branches	Leaves with Continuous Branches	No Roads, Trails	Roads, Trails Present
Flat	Low	X	X	X	X		X	
	Low	X	X	X				X
	Medium	X	X		X			X
	Medium		X			X	X	
	High		X			X		X
Gentle Slopes or Rolling	Low	X		X			X	
	Medium	X			X	X	X	
	Medium		X	X	X			X
	High		X		X	X		X
Steep Slopes	Low	X		X	X		X	
	Medium		X			X	X	
	High		X	X	X			X
	Extreme		X			X		X

Moist = Bottoms, north or east facing slopes, coves and hollows, moist lowlands  
 Dry = Ridges, south and west facing slopes, dry, well-drained lowlands

*Acknowledgments:*

The author thanks Dr. Patrick Brose of the U.S. Forest Service, Northern Experiment Station, for his gracious assistance and the Kentucky Division of Forestry and Dr. Mary Arthur, professor at the University of Kentucky, Department of Forestry, for review of the manuscript.

## WILDFIRE RESOURCES AND INFORMATION

### FOREST FIRE HAZARD SEASONS:

- Spring Forest Fire Hazard Season: Feb. 15 - April 30
- Fall Forest Fire Hazard Season: Oct. 1 - Dec. 15

### DEBRIS BURNING:

- During fire seasons, it is illegal to burn anything within 150 feet of any woodland between the hours of 6 a.m. and 6 p.m.

### KENTUCKY DIVISION OF FORESTRY WEB RESOURCES:

A one-stop shop for all information related to wildfires in Kentucky...[www.forestry.ky.gov](http://www.forestry.ky.gov)

- **Woodland Homes and Property:** Excellent information on protection of homes in the woods has been developed by Kentucky's FIREWISE PROGRAM. Click on Kentucky Firewise
- **Reporting Arson and Unauthorized Burning:** You can contact local law enforcement or contact one of the nine district offices of the KDF. Click on District Office Locations
- **Getting Assistance Developing a Wildfire Plan:** Contact one of the nine district offices of the KDF. Click on District Office Locations
- **Up-To-Date Information on Fire Conditions and Laws:** Click on Daily Wildland Fire Report

*About the Author:*

Jeff Stringer, Ph.D. is a hardwood extension specialist at the University of Kentucky and is responsible for continuing education and research in hardwood silviculture and forest operations. He is also an editor of the Kentucky Woodlands Magazine.

Cooperative Extension Service, Department of Forestry, University of Kentucky, 201 Thomas Poe Cooper Building, Lexington, KY 40546-0073; E-mail: [stringer@uky.edu](mailto:stringer@uky.edu); Phone: 859.257.5994; Fax: 859.323.1031.

In times of economic hardship and recession, we all think about how we are spending our hard-earned money. Many people ask, “exactly what am I getting for my membership dues to KWOA?” The only “tangible goods” that you receive with a membership in KWOA is a copy of our quarterly newsletter; but the “intangible goods” are priceless.

The Kentucky Woodland Owners Association (KWOA) was founded in 1994 and is one of the 36 state affiliates of the National Woodland Owners Association (NWOA). It is truly designed to be a statewide organization for woodland owners in Kentucky. KWOA has 15 members on the board of directors representing the northern, eastern, central, and western zones of Kentucky and three directors-at-large. Our board members are quite diverse. Some own large tree farms and actively manage their timber for harvesting (some even do the harvesting themselves); while others own smaller farms and are more interested in the aesthetics of woodland ownership and/or recreational uses of the land. We all may have different management plans and goals for our woodlands, but everyone shares one common goal: to improve the privately-owned forestland in Kentucky. We try to achieve this goal by:

- Promoting economically and environmental-sound forest management practices.
- Advancing the skills of Kentucky woodland owners.
- Providing communications and networking among Kentucky woodland owners.
- Lobbying for Kentucky woodland owners in legislative activities.
- Keeping the general public informed about the importance of woodland management and how it contributes to Kentucky.

To keep current and provide input on forestry-related issues in Kentucky, KWOA has representation on the Kentucky Best Management Practices Board, Kentucky Tree Farm Committee, Kentucky Forest Health Task Force, Kentucky Conservation Committee, Kentucky Farm Bureau, Kentucky Forest Industries Association, the Legislative Commission Task Force on Land Stewardship and Conservation, Kentucky Agriculture Council and the NWOA. We also attend every forestry-related seminar/meeting/workshop that is offered in the state and report any useful information to our members.

No officer or board member of KWOA receives any form of monetary remuneration. We donate

our time, our phones, our computers, and our gasoline because we have a genuine interest in the woodlands of Kentucky. We do employ the services of a bookkeeper and a professional Web site developer on a limited “as needed” hourly basis. So where does the money collected for membership dues go? The biggest expense in the operation of KWOA is postage. Another ongoing expense is the maintenance fees for our Web site ([www.kwoa.net](http://www.kwoa.net)). Every spring, KWOA sponsors a two-day annual membership meeting and field demonstration. KWOA also provides sponsorship for many of the woodland owner short courses, educational forestry field days and educational forestry-related seminars that are offered around the state.

KWOA strives to serve as a source of information for Kentucky landowners. Since the newsletter is only published quarterly, announcements of upcoming seminars, meetings, and other important forestry-related issues are continually updated on the Web site. KWOA provides a forum for landowners to ask questions concerning their woodlands, and experienced landowners and forestry professionals provide the answers.

In his inaugural address on January 20, 1961, President John F. Kennedy made this famous quote: “Ask not what your country can do for you—ask what you can do for your country.” KWOA is a nonprofit organization comprised of independent woodland owners. What can you as a member do for KWOA? You can SPEAK OUT! When forestry-related issues come before our national and state legislators, contact your legislators and let them know how you feel about the issues. It is unfortunate, but in politics the squeakiest wheel gets the most oil.

Betty Williamson  
President, KWOA  
270.821.8657  
[bettykwoa@bellsouth.net](mailto:bettykwoa@bellsouth.net)



[www.kwoa.net](http://www.kwoa.net)

# Emerald Ash Borer Is Here –

# What Happens Next?



by Lee Townsend and Joe Collins

Photo courtesy: David Cappaert, Michigan State University, Bugwood.org

The May 2009 discoveries of the emerald ash borer (EAB) at two locations in central Kentucky were not unexpected (see *Kentucky Woodlands Magazine* July 2006, Vol. 1[2]). The expansion of this exotic invader throughout our neighboring states had been well documented, and arrival in Kentucky was just a matter of time. A detection program for Kentucky had been carefully planned and carried out with the now familiar purple pyramid traps seen hanging in ash trees over the past two summers. Knowing that this insect was coming didn't lessen the blow once it was confirmed.

As of mid-July, additional EAB infestations were confirmed for a total of seven counties. This triggered a 20-county quarantine to slow the spread of the insect (Figure 1). Unfortunately, experience tells us that infestations generally are two to three years old before they are detected, based on symptoms of infested trees. This means that there almost certainly has been some local spread beyond the initial source. Also, clean-up of widespread storm damage and movement of this wood may have inadvertently caused more movement

of the insects. On the positive side, the purple pyramid traps appear to be attracting and collecting EAB, so processing of the approximately 6,000 traps set this year will help to give a clearer picture of the infestation in Kentucky.

### What Will the EAB Infestation Map Look Like in 10 Years?

Naturally, no one knows, but woodland owners and forest managers can have a significant impact on the spread of the EAB in Kentucky. Promoting EAB awareness, compliance with quarantines, and careful handling of ash wood will go a long way toward minimizing the spread of this devastating pest. Fortunately, quarantines in neighboring states seem to have held relatively well so far, minimizing the spread of the borer (Figure 2). Some "new" discoveries may have been started before legal actions were implemented.

Normal flight spread of the EAB is between one-half to two miles annually, so natural spread tends to be slow. Unfortunately, movement of infested ash wood can result

in jumps of hundreds of miles. Slowing the spread can buy time to develop and implement management plans based on ash components of wooded areas and to take advantage of strategies that might be developed through current research.

Kentucky's

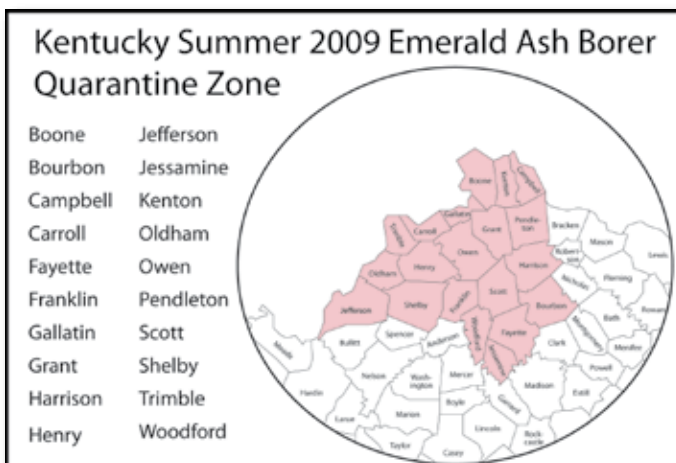


Figure 1: Left Figure 2: Above



20-county quarantine was carefully formulated by state and federal officials and included input from forest managers and the wood industry. The approach included the seven counties with confirmed infestations along with adjacent counties and those with high densities of ash trees. This approach allows movement of ash wood within the quarantine area and responsibly minimizes economic impacts as much as possible.

### What Are the Next Steps?

Collection and evaluation of traps in September should help to give a clearer picture of the EAB in Kentucky. Trapping results will give a basis for evaluating efforts to date and planning for 2010. If EAB is found in new areas, then expansion of the quarantine and development of new plans may be necessary. Unfortunately, finding no EAB in traps does not mean that the insect is not present.

Continuing education on the EAB and steps to prevent its spread will build on the base that has been developed. Publicity following the discovery of the EAB in Kentucky, along with news of the quarantine, increased awareness of this insect and resulted in the inspection of many ash trees suspected of being infested. This will help to increase surveillance efforts to supplement the trapping program.

### Things to Do:

1. Become more knowledgeable about the EAB and keep up with its status in the state and region. The following Web pages will help with this:
  - [www.emeraldashborer.info/](http://www.emeraldashborer.info/) is the gateway to a wealth of information and publications.
  - <http://pest.ca.uky.edu/EXT/EAB/welcome.html> tracks the status of the EAB in Kentucky.
  - [www.KyStateEnt.org](http://www.KyStateEnt.org) Kentucky's Office of the State Entomologist.
2. Be familiar with the signs and symptoms of an EAB attack and report suspected sites to the Office of the State Entomologist at 859.257.5838 or [ky-ose@lsv.uky.edu](mailto:ky-ose@lsv.uky.edu). Confirmation of borer infestations in a new county must be based on having a stage of the insect, either larva or adult.

However, adults are active for a relatively short period of time from mid-May through June, and larvae may be hard to find in some cases. Borer galleries beneath the bark and emergence holes in tree bark are distinctive and are helpful in recognizing potential infestations until the insect can be collected. EAB galleries tend to be S-shaped, meandering back and forth under the bark (Figure 3). In contrast, those of some of the native borers in ash tend to be relatively straight. This is something that can be checked at any time of the year, even if the insects are not present. EAB females lay their eggs on the trunk or lower portions of major



Figure 3

branches from late May through June. Eggs hatch in about a week, and the larvae feed on the inner bark and outer sapwood until October. They will spend the winter as full-grown larvae in the outer sapwood and pupate in the spring. Adults will emerge through distinctive D-shaped holes in the bark in May (Figure 4).



Figure 4

Photos courtesy: Lee Townsend

3. Keep up-to-date on the status of the EAB quarantine. Here are some key points:
  - The quarantine prohibits “regulated articles” from being moved outside a quarantined area without a certificate or limited permit except under certain conditions. A regulated article may be moved by the U.S. Department of Agriculture or the Kentucky Department of Agriculture for experimental or scientific purposes; may be moved in an enclosed vehicle or completely covered to prevent access by the emerald ash borer (through Sept. 30); may be moved directly through the quarantined area without stopping except for traffic conditions and refueling; may be moved if it is stored, packed, or handled at locations that do not pose a risk of infestation; and may be moved if it has not been combined or commingled with other articles.
  - “Regulated articles” are defined as the emerald ash borer, hardwood firewood, ash nursery stock, green ash lumber, other ash material, and any other materials that present a threat of artificial spread of the emerald ash borer. Regulated articles that have not been treated can be moved out of the quarantine area during the non-flight season (October through March) with a limited permit. Both the shipper and receiver must have compliance agreements, and the processing mill must process the materials by April 1.

The EAB is in Kentucky to stay, and its distribution in the state will continue to expand. A sound plan for living with it has been developed based on research findings and experiences from older infestations. The challenge is to do everything we can to make the plan work and learn to manage the EAB.

### About the Authors:

**Lee Townsend, Ph.D.** is an extension entomologist at the University of Kentucky. He provides extension programs related to the management of insect pests of tobacco, forages, livestock and coordinates the pesticide applicator training program for private and commercial applicators.

Cooperative Extension Service, Department of Entomology, University of Kentucky, S-225 Agricultural Science Center North, Lexington, KY 40546-0091; E-mail: [ltownsen@uky.edu](mailto:ltownsen@uky.edu); Phone: 859.257.7455; Fax: 859.323.1120.

**Joe Collins** is a senior nursery inspector at the University of Kentucky in the Office of the State Entomologist. He works with plant nurseries across the state.

Office of the State Entomologist, Department of Entomology, University of Kentucky, S-225 Agricultural Science Center North, Lexington, KY 40546-0091; E-mail: [joecollins@uky.edu](mailto:joecollins@uky.edu); Phone: 859.257.5838; Fax: 859.257.3807.



# *Kentucky's Forest Industry - Down But Not Out*

The current economic downturn has negatively impacted Kentucky's forest industry, from the logging sector to the producers of finished goods and everyone in between. Our forest industry was responsible for a peak of \$8.1 billion in economic impact for the Commonwealth several years ago, and while it has been rocked, it has not and will not collapse. The final economic response of our forest industry to the economic downturn will not be known for several years. However, verbal reports from sawmills and secondary forest industries that make furniture and other finished goods and logging data and information from consulting foresters provide a snapshot of the condition of the forest industry.

## *Kentucky's Sawmills - weathering the storm and positioning for the future*

*by Bob Bauer, Executive Director, Kentucky Forest Industries Association*

The forest products industry in Kentucky continues to move through difficult times with hope that the economy and markets will get better as the year moves along. Hardwood production figures have been declining over the past couple of years and seem to have reached a low point. National production figures have declined from 12.6 billion board feet in 1999 to under 7 billion board feet in 2008, a 44.4 percent reduction.

Production figures this year continue to show a decrease. A number of mills are seeing some market improvement, related primarily to inventory reductions, but not substantial improvements in sale of finished wood products. The past winter brought reductions in lumber production and cutbacks at many processing facilities. This decrease in production is now finally catching up, allowing better movement of available wood to processing facilities.

The lower production and declining markets have resulted

in the forced closing of many facilities and job loss in the industry, which have reduced the availability of logs and the resulting loss of loggers throughout the state.

These factors have resulted in a squeeze on the industry. Less timber is available on the market due to lower stumpage prices, and at the other end, consumers in the current economy are not willing to pay more money for durable goods such as furniture, cabinets, and flooring. These factors, combined with a continued slowdown in the housing market, have created a very challenging market atmosphere.

On the bright side, wood products industries in Kentucky have tightened the ship and seem to be surviving better than in some other states. The general feeling within the industry is that a steady improvement is under way and markets will continue to slowly improve into 2010.

## *Secondary Industries - producers of finished products have experienced a 35-50 percent reduction in sales*

*by Bobby Ammerman, Secondary Wood Industry Technical Advisor, UK Forestry Extension*

The secondary wood industry, both in Kentucky and nationally, has certainly seen better days. The industry includes those facilities that produce products such as cabinets, hardwood flooring, millwork, cooperage, dimension components, hardwood pallets, and other value-added products. The health of the secondary wood industry is directly connected to the national economy and specifically housing starts and remodeling, for which many of the products produced by the industry in Kentucky are manufactured. A reduction of any kind in new home building will have a negative impact on this industry, and several facilities across the state have been sold or closed as a result of the current economy. Several others are reporting a decline in sales of as much as 50 percent. The Hardwood

Market Report ([www.hmr.com](http://www.hmr.com)) is reporting that the cabinet, wood furniture, and flooring industries have all had reductions nationally in sales and shipments of approximately 35 percent on average, which strongly correlates to the reduction in housing starts - 50 percent since 2007. Kentucky's industry will probably not see much improvement until housing starts and the economy in general begin to improve. Many experts are predicting some improvement beginning in late 2009 or early 2010, with more significant improvements by 2012.

## Logging and Timber Revenue Loss - 40 percent reduction in logging means a direct loss of \$46 million to woodland owners and \$230 million to rural economies

by Jeff Stringer, Extension Professor, UK Forestry Extension and  
Mark Schuster, Kentucky Master Logger Program Coordinator,  
Kentucky Division of Forestry

Logging provides the resource that supports the wood industry in Kentucky, and the strength of the wood industry can be gauged by logging activity. In Kentucky, the number of Kentucky Master Loggers and the number of logging sites inspected by the Kentucky Division of Forestry provide data that reflect the strength of the logging sector. Figure 1 shows the number of Kentucky Master Loggers (KMLs) by year. The high number of loggers obtaining their KML designation in 2000 and the relatively high numbers doing so in 1998 and 1999 are attributable to the initiation of the Kentucky Forest Conservation Act in 2000. The inset shows the steady decline in new loggers since 2004. The total number of KMLs is currently at 3,010, a 26 percent drop in loggers compared to the high of 4,055 in 2004 (Figure 2).

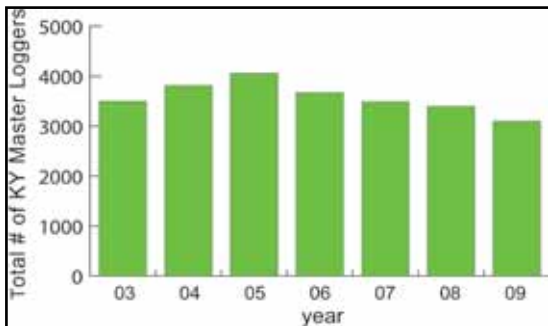


Figure 2. Total number of Kentucky Master Loggers (2009 projected from registration records.)

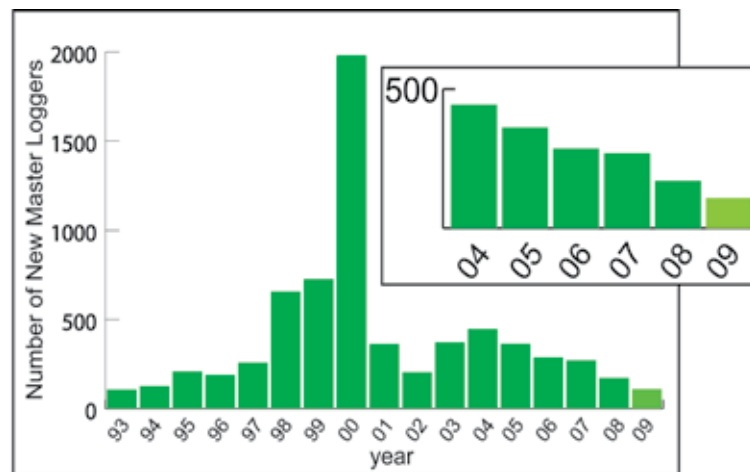


Figure 1. The number of loggers by year obtaining their Kentucky Master Logger designation. The inset shows activity over the last six years.

The total number of KMLs is currently at 3,010, a 26 percent drop in loggers compared to the high of 4,055 in 2004 (Figure 2). The number of logging inspections is also an indicator of the strength of the logging industry. Data from the Kentucky Division of Forestry indicate that logging sites inspected hovered around 1,000 (980 to 1,079) in the first six months of 2006, 2007, and 2008. However, only 658 logging sites were inspected during the first half of 2009. While part of this reduction was a result of fewer logging inspectors in 2009, accounting for this still indicates a drop of approximately 27 percent in logging activity in 2009. Both of these factors indicate a pronounced reduction in the number and activity of loggers in 2009. This reduction in logging activity represents a loss of \$46 million in timber revenues for landowners in Kentucky, a loss of 2,384 jobs, and a total loss of \$230 million for rural economies through the reduction in sawmilling since 2004.

## Timber Sales - unsold timber common across the state

by Billy Thomas, Extension Forester, UK Forestry Extension

Timber sale activities are another way to look at the status of the wood industry. To better understand how timber sales activities have changed over the last year, several consulting foresters with the Kentucky Association of Consulting Foresters ([www.kacf.org](http://www.kacf.org)) graciously shared the following information from Eastern, Central, and Western Kentucky.

**Eastern Kentucky:** Consulting foresters are generally advising woodland owners to hold off on timber sales until markets improve. The number of sales has drastically decreased, and consulting foresters are receiving very few calls from mills looking for timber. Prices are down approximately 30 percent, with red oak suffering the most. It has also been harder to move yellow-poplar because of the indefinite closing of the Weyerhaeuser mill in Hazard. One positive is that there seems to be more interest in developing woodland management plans and carbon inventories.

**Central Kentucky:** Slight improvement has occurred since January, when a number of mills were idled. While some mills are buying, the prices are down about 25 to 30 percent. The cedar market does not seem to be as negatively impacted as some other segments of the timber market. There is concern

about ash and the current quarantine related to emerald ash borer. Demand for railroad tie logs has remained reasonably strong, resulting in continuing sales of smaller diameter timber. The central region is also seeing an increase in woodland management plans and appraisals.

**Western Kentucky:** Woodland owners are being advised to hold off on timber sales if possible. Many timber sales have not received the minimum bids, and overall demand has also dropped significantly, as many mills have lowered their demand. Generally, timber prices are down about 30 percent, with lower demand for pulpwood. However, yellow-poplar and tie logs are still moving, albeit slightly discounted. The January ice storm caused some salvage logging that the markets were not ready for, and woodland owners and loggers suffered accordingly.

### Acknowledgements

The editors would like to thank the contributors listed above as well as Tim Metzger with the Kentucky Division of Forestry and consulting foresters with the Kentucky Association of Consulting Foresters.

# Forest Health



## Invasive Plant Hit List: Chinese Silver Grass

by Jeff Stringer



*Chinese silver grass, also known as Miscanthus, is an attractive ornamental that is also a serious invasive plant threat.*

*Photo courtesy: James H. Miller, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)*

Chinese silver grass is a highly prized ornamental bunch grass that has been widely planted for the aesthetic beauty of its foliage and tall flower heads. Unfortunately, this grass easily escapes from its ornamental grounds and establishes along roadsides and other disturbed ground in rural areas. Chinese silver grass (*Miscanthus sinensis*), also known as zebra grass, eulalia grass, eulalia, Chinese fairy grass, and by its scientific name (*Miscanthus*) has many varieties that are planted for wind-breaks, and some varieties are being considered for large-scale plantings to produce biomass. As is the case with many invasive plants, *Miscanthus* hails from Asia (China, Japan and Korea) and was brought to the United States as an ornamental. It has spread throughout the eastern United States, Colorado and California.

The species can spread from the physical movement of rhizomes, which it produces abundantly. This occurs when disking ground that is infested and when moving equipment, thus spreading rhizomes to new areas. However, it can also spread from other types of mechanical disturbance. Although spread from rhizomes is common, it can also move from wind dispersion of the seed. However, the latter has not been shown to be as important as the spread from the rhizomes.

*Miscanthus* establishes along roadsides and other rights-of-way, forest edges, river and lake banks, and disturbed areas and can form very dense infestations. It can also spread from

initial planting in yards of abandoned home sites. When thick infestations occur, *Miscanthus* can easily outgrow and kill out many native species. Also, the dry foliage in the fall can be a wildfire hazard.

### Identification and Life Cycle

*Miscanthus* is easy to identify. It can be confused when young with some native grasses, but there are no native grasses with these particular characteristics:

- occurs in bunches;
- has foliage that reaches 3 to 5 feet in height;
- has pink or reddish flower heads that reach between 5 and 10 feet in height and turn gray or tan in the fall. The flower stalks start to develop in August and mature in November. Some varieties have alternating green and white bands on the long leaves.

There are no native species of *Miscanthus*, and the few possible look-a-likes include big bluestem grass, that can get as tall as *Miscanthus*. However, big bluestem grass has a three-pronged flower head that resembles a turkey foot.

As discussed earlier, *Miscanthus* spreads primarily by underground roots or rhizomes, and mature plants have extensive perennial root systems. New growth emerges in mid-spring and rapidly replaces the previous year's dried leaves. The viability of the seed is different, depending on variety, but the main type of spread is vegetatively from the roots and rhizomes.



*Miscanthus establishing along a forest edge.*

*Photo courtesy: Arthur E. Miller, USDA APHIS PPQ, [www.forestryimages.org](http://www.forestryimages.org)*



*Rhizomes of Miscanthus can be spread when ground is disked.*

Photo courtesy: Leslie J. Mehrhoff, University of Connecticut, [www.forestryimages.org](http://www.forestryimages.org)

Miscanthus will grow over a wide range of soils but prefers moist, well-drained soil to reach its maximum height and fullness. It prefers full sunlight, but can persist in the shade of small openings and sparse overstories. Miscanthus will grow in relatively cold climates (Zone 5) as well as warm climates (Zone 9).

**Control**

Miscanthus can best be controlled using herbicides. Due to the extensive root systems and rhizomes, it is very difficult to control by hand pulling, disking, and other mechanical treatments. Individual plants or small areas can be hand grubbed if follow-up occurs the next year to take care of missed plants. See table below for control options.

**Table 1. Control methods for Chinese silver grass (*Miscanthus sinensis*).**

Method	Timing	Details and Cautions <sup>1</sup>
Hand pulling/grubbing <sup>1</sup>	anytime	<ul style="list-style-type: none"> <li>Limited effectiveness due to extensive root system/rhizomes.</li> <li>Hand grubbing individual plants or very small patches may be possible with due diligence to removal of all root systems.</li> <li>Monitoring is necessary, and follow-up treatments will most likely be required.</li> </ul>
Mowing/disking	not effective	<ul style="list-style-type: none"> <li>Rhizomes will still persist after mowing or disking.</li> </ul>
Area-wide broadcast foliar herbicide <sup>1,2</sup>	September - October	<ul style="list-style-type: none"> <li>Generic glyphosate brands (see label for appropriate brand required for the area) at 1.0-1.5 quarts per treated acre. Use a non-ionic surfactant (0.5%) to improve effectiveness.</li> <li>Accord™ used for applications in the forest or forest edge.</li> <li>Roundup Pro brands for non-crop areas (rights-of-way and industrial sites).</li> <li>Roundup brands for use in fields and fencerows.</li> </ul>
Hand or small equipment applied spot foliar herbicide <sup>1,2</sup>	May/June or September/October	<ul style="list-style-type: none"> <li>Arsenal AC 1% solution in water.</li> <li>Glyphosate herbicides (Accord, Roundup Pro brands, or Roundup brands, depending on location) 2% solution in water.</li> <li>Thoroughly wet foliage of treated plants.</li> </ul>

<sup>1</sup> All areas or plants need to be checked for resprouting the year following treatment and reapplication to all foliage.  
<sup>2</sup> Other herbicide brands can be used for control. The herbicides that are listed are those commonly used regionally and are labeled for use in forests (woodlands).

Drawing courtesy: USDA PLANTS Database, USDA NRCS PLANTS Database, [www.forestryimages.org](http://www.forestryimages.org)

**About the Author:**

**Jeff Stringer, Ph.D.** is a hardwood extension specialist at the University of Kentucky and is responsible for continuing education and research in hardwood silviculture and forest operations. He is also an editor of the Kentucky Woodlands Magazine.

Cooperative Extension Service, Department of Forestry, University of Kentucky, 201 Thomas Poe Cooper Building, Lexington, KY 40546-0073; E-mail: [stringer@uky.edu](mailto:stringer@uky.edu); Phone: 859.257.5994; Fax: 859.323.1031.

www.KyForestHealth.org



# Kentucky Tree Farm Committee Newsletter

## *Tree Farm Legislative Network*

*by Bob Bauer, Kentucky Forest Industries Association and Kentucky Tree Farm Committee Treasurer*

The American Forest Foundation's Grassroots Action Network is mobilizing Tree Farmers in all states to join a network of family forest owners who share the common goals of keeping family forest owners on the land, maintaining our forests, and encouraging sustainable forest management.

The foundation has set two long-term goals for the network:

- Rallying family forest owners and bringing their voices to the public policy process
- Advancing policies that support and encourage the viability of family forest ownership

To achieve these goals, the network is focusing on public policy advocacy at the federal, state, and local levels. In 2009, the network is focusing on a number of public policy issues, including forest-related taxes,

renewable energy from forests, climate change, green building legislation, issues related to the Endangered Species Act, and farm bill- funded forestry and wildlife programs.

We need tree farmers in Kentucky to join the network, take time to build relationships with their state and federal legislators, and provide legislators information as issues arise. Our federal and state representatives want to hear from their constituents—your voice really does matter!

There are now over 90,000 Tree Farmers in 46 states and over 800 in Kentucky. Think about what a powerful voice we can be when we join together to make a difference. You can join the network and become an active voice for landowners by going to the following link to register: <http://capwiz.com/forestfoundation/mlm/signup>. Contact Bob Bauer at the office of the Kentucky Forest Industries Association, 502.695.3979, for additional information.

## *Kentucky Tree Farm Web Site*

*by Pam Snyder, Kentucky Division of Forestry and Kentucky Tree Farm Committee Vice Chair*

Did you know the Kentucky Tree Farm Committee (KTFC) sponsors a Web site for landowners, tree farmers, and inspectors alike? It can be found at [www.kytreefarm.org](http://www.kytreefarm.org). This site has the latest KTFC news and events calendar, a member list for the tree farm committee, a mission statement, and links to the National Tree Farm Web site. It is a communication hub for inspectors. Check it out!

If you don't have access to the Web but are interested in becoming a Kentucky Tree Farmer and part of the American Tree Farm System, contact the Kentucky Forest Industries Association at 502.695.3969 or the Kentucky Division of Forestry at 502.564.4496.



## *Kentucky Tree Farm Inspectors*

*by Pam Snyder*

Kentucky Tree Farm Inspectors are foresters or forestry technicians who meet the educational qualifications and have completed the required American Tree Farm System certified training program. Did you know that all tree farm inspectors are volunteers? Yes, volunteers. The Kentucky Tree Farm Committee (KTFC) appreciates the dedication and time that inspectors give to promote the American Tree Farm Program and to inspect and certify tree farmers across Kentucky. Inspectors do a lot of work for the KTFC.

What do inspectors do for landowners? It may be as simple as writing a forest stewardship plan and/or providing silvicultural guidance to landowners who have the opportunity to become certified tree farmers. Inspectors may be forestry technicians, consultant foresters, industry foresters, or foresters with the Kentucky Division of Forestry. Inspectors are required to complete refresher courses to keep their status current. If you are interested in becoming a Kentucky Tree Farm Inspector contact Pam Snyder with the Kentucky Division of Forestry at 502.564.4496 or check out the American Tree Farm System Web site at [www.treefarmssystem.org](http://www.treefarmssystem.org). This article is dedicated to all past and present tree farm inspectors. We appreciate all the time you have donated to the Kentucky Tree Farm Program and the support you have given to Kentucky Tree Farmers.





## Profile of a Tree Farmer — Angus M. MacLean

by W. Cary Perkins, Kentucky Tree Farm Committee Vice Chair

I first met Angus M. MacLean in 1977 when I was Chief Forester for the Kentucky Division of Forestry's Bluegrass District. Mr. MacLean was managing the woodland on the farm of his father, Angus D. MacLean. The property is located on the Ohio River and Morris Branch, its tributary, in Oldham County. The property was first certified as a Tree Farm on March 1, 1959, in a state-wide ceremony.

One-hundred acres of the woodland was passed on to Angus M. MacLean when his father passed away, and it remains an exemplary Tree Farm today. This past spring, Angus M. MacLean was presented a Golden Tree Farm sign to signify the properties' 50 years as a Tree Farm.

There have been eight timber harvests of various sizes on the Tree Farm since 1959, including walnut veneer sales, tornado salvage, a cedar sale, and three selective harvests. The most recent harvest was 238,000 board feet in 2005.

In addition to commercial harvests, rough lumber from the property has been used for the construction of a shed and two barns and over 2 miles of plank fencing. The fence posts were black locust harvested from the property. In addition, an extensive amount of firewood has been salvaged from dead or dying trees or the

unused tops of harvested trees.

Over the years, the MacLeans also planted over 20 acres of white pine and walnut and engaged in various practices for timber stand improvement. It's hard to top the aesthetics of the property, with the view from the MacLean residence high on the Ohio River bluff. There has always been abundant wildlife, including deer, turkey, and waterfowl on the Ohio River.

The latest ongoing project is a cooperative effort with the American Chestnut Foundation. Some 150 Kentucky back-cross seedlings, a cross of 15/16 American chestnut and 1/16 Chinese chestnut, are being propagated in an orchard. As the trees reach sapling size, they will be inoculated with the chestnut blight to test blight resistance. It is expected that 12.5% of the trees will show moderate blight resistance. These surviving trees will help form the basis of the next intercross generation and hopefully the future restoration of American chestnut in Kentucky.

For his many years of work and dedication to the ethic of sustainable forest management, the Kentucky Tree Farm Committee salutes Angus M. MacLean. Thanks for a job well done!



Angus M. MacLean

## Outstanding Tree Farmer of the Year Field Day

by Billy Thomas, UK Forestry Extension and Kentucky Tree Farm Committee Field Day Coordinator

The Kentucky Tree Farm Committee recognizes the Outstanding Tree Farmer of Year by hosting and sponsoring a field day for woodland owners. The Tree Farmer of the Year field day will be Nov. 2 at Henry Duncan's farm in Logan County. Mr. Duncan was honored with the title of Outstanding Tree Farmer of the Year for 2008 at the Kentucky Forest Industries Association annual meeting in April. We will start and end the field day at the office of the Logan County Cooperative Extension Service. Mr. Duncan's farm is just a couple of miles from the extension office, and following a tour of the farm, we will return to the extension office for dinner.

The field day is free, but pre-registration is required so that we can plan accordingly for the meal. To register and for directions, call 859.257.7597 or visit [www.ca.uky.edu/forestryextension/calendar.php](http://www.ca.uky.edu/forestryextension/calendar.php).

### Tree Farmer of the Year Field Day Agenda - November 2

- 1 – 1:30 p.m. Registration (*Logan County Extension Office*)
- 1:45 – 4:45 p.m. Tree Farm Field Tour (*Henry Duncan Tree Farm*)
  - Tree Farm History and Overview — Henry Duncan
  - Forest Management Plan and Selective Timber Marketing — James Morris, Kentucky Division of Forestry
  - Timber Sale Discussion — Kraig Moore, Kentucky Association of Consulting Foresters; Bob Bauer, Kentucky Forest Industries Association
  - Cost Share Programs (EQIP Streamside Fencing and Streamside Management Support) — Craig Givens, Natural Resources Conservation Service
- 5 p.m. Dinner, Presentations, and Fellowship (*Logan County Extension Office*)



# Test Your Knowledge

Photo courtesy:  
www.mosbybuildingarts.com



**A.** If you'd seen me, you'd definitely remember me. I usually get at least an inch long and am often solid black but can be confused with my yellow and black-striped cousin. I've been told I have a bit of an attitude problem but I just don't like any person, dog or even bird invading my territory. Yeah, you will occasionally see me around flowers, but my thing is wood – I just love untreated wood! If you don't use pressure-treated wood on your deck, I will be sure to make my presence known. Who am I?

**B.** I come from a very large family, often numbering in the thousands. You'll normally find me out in the middle of your field because my family really doesn't like shade. However, if we find a place we like and decide to establish our colony in an area that has a few plants or trees around, we'll simply inject them with our formic acid and they are history. I would suggest that you think twice before messing with our mounds because we do tend to get a bit rowdy when provoked and we will protect ourselves and it'll hurt. Do you know me?



Photo courtesy: Steven Katovich, USDA Forest Service, [www.insectimages.org](http://www.insectimages.org)

**C.** I like to grow on fences, telephone poles, Buicks and just about anything else my rootlets can grab onto. I tend to get carried away sometimes if given free reign, especially in nursery plantations where I've been known to run amok. But, I'm not all bad, my bright orange, or sometimes red, trumpet-shaped bloom brings in the hummingbirds, bees and butterflies. Though I am a bit tenacious, I do make a beautiful backdrop on a trellis or pergola. Do you know me?



Photo courtesy: Chris Martin, [www.public.asu.edu/~camartin/](http://www.public.asu.edu/~camartin/)

**D.**

I'm probably one of the last plants you expected to see growing naturally in Kentucky, but I am native and don't be surprised if you find me. I do prefer drier soils, but I don't usually get much taller than two feet in height, unlike my western relatives. I do have a fleshy skin which does hold some water but folks like my flower which is why I'm also a popular houseplant, but be warned, my spines are sharp but my leaves are delicious; tasting like green beans. What am I?



Photo courtesy: [www.naturemanmatt.com](http://www.naturemanmatt.com)

Answers to Test Your Knowledge can be found on page 24.



**E.**

Chances are you have probably noticed me attacking the trees in your town. I prefer oaks, especially pin oaks, but I will settle for sweetgum, red maples and sycamores if oaks aren't around. The rumor is that I am spread through leafhoppers and as I build up in my host, I partially clog up the tree's internal plumbing to the leaves, causing a scorched appearance. Once I get rolling, I will kill my host and move onto the next victim. If am already in your neighborhood and you don't want me to visit your home, plant trees that are resistant to me. Do you know me?

Photo courtesy: University of California Statewide IPM Project, Regents, University of California



# Forestry 101

## Forestry 101: Aging Trees

by Doug McLaren and Jeff Stringer

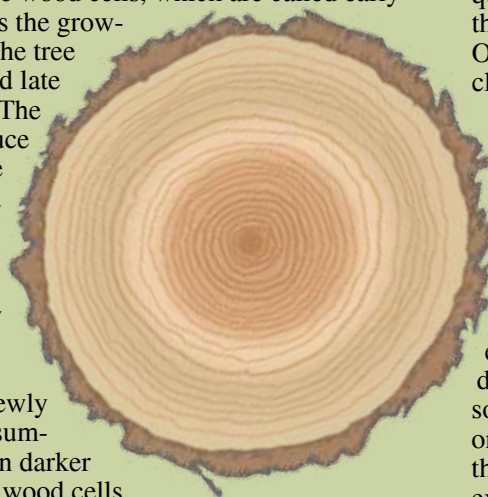
Inevitably, when foresters walk through a woodland with the owner, one of the first questions asked when standing among large trees is “How old do you think these trees are?” This is a common question, and it is important to know the answer if the woodland is to be managed properly. Several methods can be used to age trees. Estimates can be made by experienced foresters and loggers by looking at the size of the trees and considering the site and bark pattern. However, the only accurate way to determine the average age of trees in a woodland or to age a specific tree is by counting growth rings, which are also called annual rings.

### Annual Rings

An annual ring, the band of wood that is produced in one year, is actually composed of two types of cells. During the spring of the year trees produce wood cells, which are called early or spring wood cells. As the growing season progresses, the tree produces what are called late or summer wood cells. The two types of cells produce the visible rings that we can count. Spring wood cells are often larger in diameter than summer wood cells. The large spring wood cells allow the tree to move massive quantities of water needed to expand the newly developed leaves. The summer wood cells are often darker in color than the spring wood cells.

The difference in these cell types is very pronounced in some species (called ring-porous trees). In Kentucky examples of ring-porous trees include oak, ash, and elm. In these species, rings are easy to see and count. Some species such as yellow-poplar have little difference between the spring and summer wood cells. This makes their annual rings harder to discern. These are called diffuse-porous trees, and they can be difficult to age (Table 1). Regardless, all trees produce annual rings composed of a ring of spring wood cells inside a ring of summer wood cells.

Counting rings on stumps is an easy way to determine the approximate age of trees in a woods where logging or tree felling has occurred. In these situations it is reasonable to assume that standing trees that are the same diameter and species as the stumps are approximately the same age. This is a general rule and is not precise. The age of tree stumps can not necessarily be applied to standing trees if the stumps and trees are of different species, particularly if they are not related species.



Counting rings on stumps is not possible in woodlands where there has not been any recent logging. In these instances foresters will use a tool called an increment borer to cut and extract a small wooden dowel from the tree, thus providing a view of the tree’s annual increments without having to cut the tree down. The increment borer (also described in “Woodland Management Tools” in this issue) functions in the same manner as a soil probe. The borer is screwed or bored into the tree, and a small round core about the size of a pencil lead is extracted. From this core, you can count the annual rings and estimate the tree’s age. Boring high-value trees is not recommended, as this leaves a hole in the wood of the tree. Generally, if foresters need to determine the average age of the overstory trees in a woodland, they will pick low-value timber trees to bore. Typically, healthy trees will grow over the holes quickly with minimal injury to the wood (besides the hole in the inner wood, which could ruin the veneer value of a tree). Older trees that are not of good vigor may have problems closing up a borer hole. Be careful not to bore trees that are valuable to you for veneer or other high values. Do not bore trees that are old or with signs of stress.

### Assessing Crowding and the Need for Thinning

Counting all the rings from the center of the tree (pith) to the last outer ring is required to age the tree. However, it can also be useful to look at the last several years of growth rings and determining how wide they are. Foresters will look at the width of the last several annual rings to determine if the tree is growing at an appropriate rate for the soil, site, and species of tree. If the tree is young and growing on a good site and the rings are very narrow, it may indicate that the woodland is very crowded. Trees need sunlight and expanded crowns to grow. Trees growing in crowded wood-

**Table 1.**  
**Examples of Common Trees in Kentucky**

Ring Porous	Semi- (Ring and Dif- fuse) Porous	Diffuse Porous
Oaks	Walnut	Maples
Hickories	Persimmon	Birch
Elms	Cherry	Beech
Ashes	Sassafras	Yellow-poplar
Coffeetree	Cottonwood	Gums
Locusts	Willow	Basswood

## Forestry for Woodland Owners

lands and/or in limited light due to shading from other trees will have narrow growth rings. Releasing this crowded or shaded tree will increase diameter growth and result in wider ring widths. If you look at the growth rings on a stump (Figure 1) and see areas of growth where the rings are very close together and other areas where they are wide, it generally indicates times when the tree was very crowded and times when the tree had little crowding or competition. A change in competition can happen when a woodland has been logged.



**Figure 1.**  
*Annual growth rings can reveal much about a tree's life.*

*Photo courtesy: Doug McLaren*

### **Response to Thinning**

If a thinning, TSI, or crop tree release has been completed in the recent past, compare the width of the rings prior to the treatment. Treatment should result in the widening of the annual rings and eventually increase the trees diameter. If this situation exists where a recent thinning could have increased the growth of the tree, a forester would need to only take a short increment into the tree rather than obtaining a core to the center pith of the tree.

### **What You Need to Age Trees**

As a woodland owner, you can assess the age of your timber stand or individual trees yourself. You will need several items. One would be an increment borer, which comes in a variety of lengths and diameters. You will need to buy a borer that has a length equal to at least half the diameter of the trees that you want to measure. Typically a 14- to 16-inch borer works well in



### **Tree Health and Age**

It may be a cause for concern if the forester looks at the last several years of growth of a larger overstory tree that is not in a crowded condition and sees very narrow rings. If the tree is reaching its maximum age and the tree is growing on a good site, this narrow ring may indicate that the tree is unhealthy, is losing crown, and may be susceptible to dying if a drought or other disturbance such as a defoliation were to occur.

*An increment borer is a specialized forestry tool that can be drilled into a tree—the extracted wood core can then be used to determine a tree's age.*

*Photo courtesy: Billy Thomas*

#### **About the Authors:**

**Doug McLaren** is an Area Cooperative Extension Specialist with the University of Kentucky Department of Forestry.

Cooperative Extension Service, Department of Forestry, University of Kentucky, 107 Thomas Poe Cooper Building, University of Kentucky, Lexington, KY 40546-0073; E-mail: dmclaren@uky.edu; Phone: 859.257.2703; Fax: 859.323.1031.

**Jeff Stringer, Ph.D.** is a hardwood extension specialist at the University of Kentucky and is responsible for continuing education and research in hardwood silviculture and forest operations. He is also an editor of the Kentucky Woodlands Magazine.

Cooperative Extension Service, Department of Forestry, University of Kentucky, 201 Thomas Poe Cooper Building, Lexington, KY 40546-0073; E-mail: stringer@uky.edu; Phone: 859.257.5994; Fax: 859.323.1031.

Certain woodland jobs can be accomplished quickly and efficiently if the right tool is used. This article covers several of the most common tools that woodland owners may need or come in contact with while managing and caring for their woodlands. While every woodland owner does not necessarily need all the tools discussed, many could benefit by adding some of these tools to their toolbox. Knowing something about them will improve



communication with foresters and loggers.

**Professional Foresters** - They are the most valuable “tool” in the box. A professional forester is someone who has a degree from an accredited forestry school and maintains his or her professional credentials through continuing

*Photo courtesy: Kentucky Division of Forestry*

the forest or during tree planting in fields. Both roll and wire flagging can be purchased from local hardware stores as well as mail ordered from forestry supply companies.

**Tree and Log Scale Sticks** - If you want to determine the volume of timber in a tree or a log, this tool is a must-have. It is

inexpensive (less than \$15) and is similar to a wooden yardstick, with various scales marked on it that allow you to measure the diameter and merchantable height in trees and logs and determine the volume of wood. Tree and log scale sticks can be used to estimate volume using the Doyle Scale (the most common log rule in Kentucky), International quarter-inch, or Scribner scale. The sticks are easy to use and come with directions.



*Photo courtesy: Steve Patton*

**Diameter Tapes, or D-tapes** - If you want to measure the diameter of a tree more accurately than can be accomplished

# WOODLAND MANAGEMENT TOOLS

by Billy Thomas and Jeff Stringer

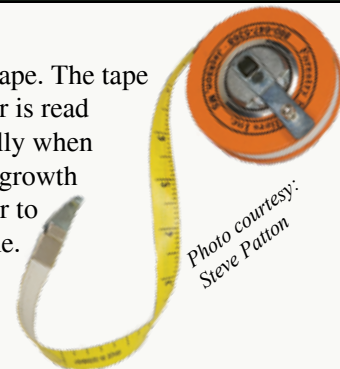
education and experience. Professional foresters include service foresters with the Kentucky Division of Forestry (KDF), private forestry consultants, and industry foresters. They often can provide you with options you never considered and help you to improve your management, inventory your woodlands, provide maps, recommend forestry practices, provide cost share and technical assistance, and in the case of consulting foresters, help you sell your timber. The primary sources of foresters for Kentucky woodland owners are the KDF ([www.forestry.ky.gov](http://www.forestry.ky.gov) or 502.564.4496) or the Kentucky Association of Consulting Foresters ([www.kacf.org](http://www.kacf.org)).

**Flagging** - Colored flagging can be used for a large number of forestry tasks, including marking crop trees, temporary boundary marking, delineating trails and potential location of activities, and anything else of interest that will need to be located again. Flagging comes in rolls made of either vinyl, which will last a couple of years, or a biodegradable material that lasts a year. Vinyl flags come on metal wires that can be stuck into the ground; both the flags and flagging can be written on with a marker. These flags are great for marking small plants in



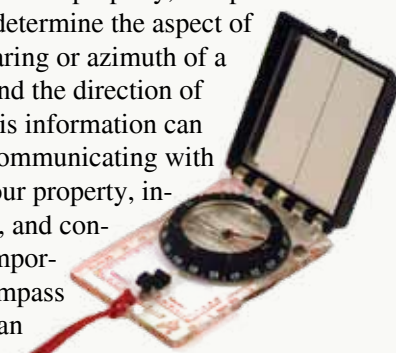
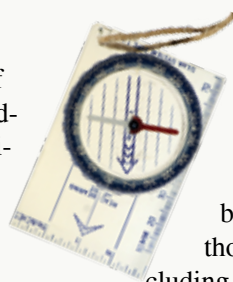
*Photo courtesy: Terry Conners*

with a tree and log scale stick, use a D-tape. The tape is wrapped around the tree, and diameter is read directly from it. D-tapes are used annually when measuring crop trees to determine their growth rate or when measuring a tree’s diameter to very accurately determine timber volume. D-tapes are an indispensable tool for a forester and can be purchased from forestry supply firms for \$35 to \$40.



*Photo courtesy: Steve Patton*

**Compass** - While most woodland owners will not get lost on their property, compasses allow you to determine the aspect of a slope, the bearing or azimuth of a boundary line, and the direction of a road or trail. This information can be very useful in communicating with those working on your property, including foresters, loggers, and contractors. A compass can also be important in an emergency. A cheap compass is often all that is necessary and can be purchased for \$15 to \$50.



*Photos courtesy: Terry Conners*

**Hatchet and Squirt Bottle** - These tools are used in combination to apply herbicides to unwanted trees and are the cheapest and most locally available tools used in forestry. Killing trees that are interfering with the growth of crop trees (crop tree release), killing invasive trees such as tree-of-heaven, and deadening poorly formed native trees in timber stand improvement (TSI) operations can be done using the hack and squirt method. These practices are commonly used in forest management and prescribed in forest stewardship plans from the Kentucky Division of Forestry. The hatchet is used to make slits around the tree, and the squirt bottle is used to spray the herbicide into the slit. Contact a professional forester to help you determine the type of herbicide needed and work with you on your techniques.



Photo courtesy: James H. Miller, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)

**Chainsaws** - Chainsaws are not only for use in logging or cutting firewood. They are also needed to cut downed trees for removal from wood roads, prune branches from trails and roads, cut vines and brush where necessary, and in some instances prune crop trees in plantations. They also can be used to cut trees for the application of an herbicide using the cut-stump method or for girdling trees in crop tree release or TSI operation. (Use a professional forester to help determine when how girdling should be used in lieu of or in combination with a herbicide.) Typically, saws with 12- to 14-inch bars can be used for pruning and light duty, and saws with 18- to 20-inch bars are large enough for cutting up downed trees, logs, and firewood. Always buy an extra chain. If you don't know how to sharpen a chainsaw, find someone locally who does and use that person. Follow directions, and buy a pair of chainsaw-resistant chaps and always wear them when using a chainsaw. Also wear eye, ear, and head protection - a good purchase is a helmet system with ear protectors and face shield. This protective gear is often available locally at chainsaw distributors.



Photo courtesy: Terry Connors

**Increment Borers** - Borers are definitely a forestry specialty item. They are used to cut and extract a small round wooden dowel called an increment core from a tree. If you take a core that extends all the way to the middle of the tree, you can count the growth rings and determine the tree's age and its historic growth pattern. A core taken only 1 to 2 inches deep can be used to determine the width of the last several growth rings, thus telling you how fast the tree is growing. Tree age and its growth rate are very important pieces of information for forestry. An increment borer consists of an auger bit, a handle, and an extractor tray that slips into the auger bit to extract a core after you have drilled into the tree. Increment borers come in a variety of sizes, and prices range from \$175 to more than \$300.

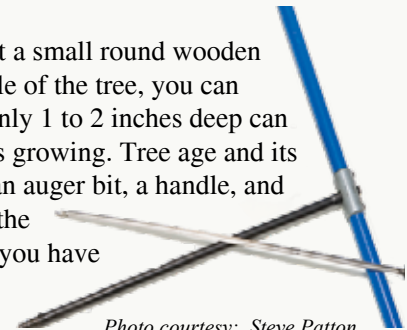


Photo courtesy: Steve Patton

<i>Common Forestry Herbicides Used in Kentucky</i>		
Active Ingredients	Brand Names	Common Use
<b>Triclopyr</b>	Garlon 3a, Crossbow (w/2,4-D)	Hack and squirt, cut stump, foliar
	Garlon 4	Basal bark application
<b>Glyphosate</b>	Accord (use in woods) Roundup (fencerows, crop, and non-crop areas), Generic brands for use in areas other than woods.	Hack and squirt, cut stump, foliar
<b>Picloram</b>	Tordon, Pathway (w/2,4-D)	Hack and squirt, cut stump
<b>Imazapyr</b>	Arsenal AC, Chopper	Hack and squirt, cut stump, foliar
<b>Hexazinone</b>	Velpar	Cut stump, soil application

Forestry supply companies that mail order all of the above forestry equipment and herbicides include:  
 Forestry Suppliers: [www.forestry-suppliers.com](http://www.forestry-suppliers.com) or call 1.800.647.5368  
 Ben Meadows: [www.benmeadows.com](http://www.benmeadows.com) or call 1.800.241.6401

**Herbicides** - Herbicides are commonly used for invasive species control and effectively and cost efficiently deadening trees in crop tree release and TSI operations. Several of the common forestry use herbicides are listed in the adjacent table.

**About the Authors:**  
**Billy Thomas** is a Extension Forester with the University of Kentucky Department of Forestry. He works primarily on non-industrial private forest issues and is the associate editor for the Kentucky Woodlands Magazine.

Cooperative Extension Service, Department of Forestry, University of Kentucky, 213 Thomas Poe Cooper Building, Lexington, KY 40526; E-mail: [billy.thomas@uky.edu](mailto:billy.thomas@uky.edu); Phone: 859.257.9153; Fax: 859.323.1031.

**Jeff Stringer, Ph.D.** is a hardwood extension specialist at the University of Kentucky and is responsible for continuing education and research in hardwood silviculture and forest operations. He is also an editor of the Kentucky Woodlands Magazine.

Cooperative Extension Service, Department of Forestry, University of Kentucky, 201 Thomas Poe Cooper Building, Lexington, KY 40546-0073; E-mail: [stringer@uky.edu](mailto:stringer@uky.edu); Phone: 859.257.5994; Fax: 859.323.1031.

**G**inseng is one of the best-known medicinal plants in the world. It has been used in China for thousands of years and has been dug and exported from America for almost three centuries. In Kentucky, it was one of the first cash crops early pioneers used to help pay their bills. In today's tough economic times, ginseng still provides an opportunity for growers of virtually wild or wild-simulated ginseng to obtain much-needed cash. The unique forestlands of Appalachia provide excellent growing conditions for this native perennial forest plant, American ginseng (*Panax quinquefolium*) see Figure 1. Kentucky is the leading exporter of wild ginseng (\$5 to \$8 million annually). Unfortunately, tough economic times and attractive root prices have increased the harvest pressure on ginseng and caused numerical declines in plant populations and the quantity of wild root exported to Asia (Table 1).



Figure 1. Ginseng is a small forest plant with very valuable roots.

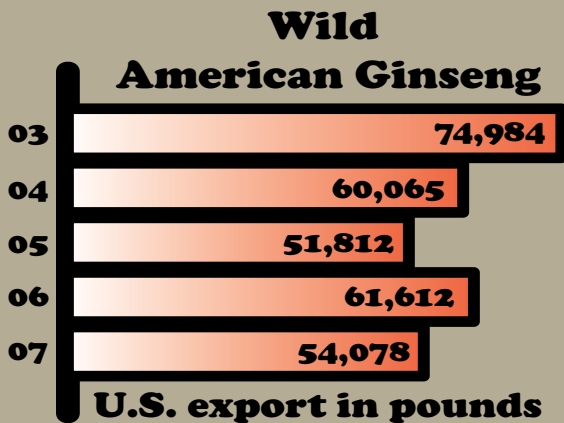


Table 1.

### Site Selection

In Kentucky, the cooler and moister north- or east-facing slopes are preferred sites. The site should receive 70-80% shade and be well drained. Standing water or heavy soils are not suitable. The site should have some slope (20-40%) so that water will drain away from the site. Ideally, the forest understory should be fairly open and have good air movement. Plant species often associated with good sites include the following: black walnut, hickories, yellow-poplar, American beech, sugar maple, jack-in-the-pulpit,

# Non-Timber Forest Products

## Forest Production of Ginseng

by R. Terry Jones

Solomon's seal, mayapple, trilliums, wild ginger, bloodroot, goldenseal and blue cohosh.

Once you've selected your site, take a soil sample and have it tested. Ginseng prefers a soil pH level between 5.5 and 6.5, with plenty of available calcium (greater than 1,500 lb) and moderate to high phosphorus levels.

For beginners, about one-half acre is enough. This would require about 0.5 to 1 lb ginseng seed (Figure 2). If possible, it is best to use locally-grown seed because it produces plants that can be better adapted to the area. Be aware of the difference between stratified and green ginseng seed. Green seed is fresh from the plants and will not germinate for 18 months. Stratified seed is seed that has been stored in moist sand for 12 to 16 months and will germinate the spring following a fall planting. Stratified seed is more expensive than green seed.

### Preparing Your Site for Planting

"Virtually wild" is probably the method of choice for ginseng because it is the easiest and least expensive method.

1. Make a seed planting device out of ½-inch pipe, a broom handle, and a hunting knife with a 6-inch blade. Construction and use of such a device is covered in *A Manual for Ginseng Growers and Trainers* by Fritch and Bamford.
2. Virtually wild ginseng is only planted in the most suitable sites on a 14- to 18-inch spacing.

3. Sow about ¼ to ½ inch deep. It should take ¼ to ½ lb, or 2,000 to 4,000 seeds/acre, and requires about 8 to 16 hours to plant.

### When to Plant

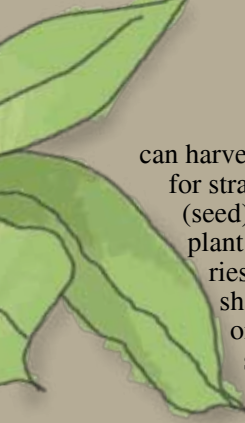
Ginseng is usually planted in the fall from October until freezing weather prevents further planting. Early spring (February/March) planting is also possible but must be done before the seed starts to germinate. Handling seed that has begun to sprout often causes damage to the young plant. Whether the seed is green or stratified, it should be carefully inspected when obtained. If the seeds are soft, moldy, or discolored, return them to the supplier for replacement.

### Ginseng Seeds

New growers should purchase their first seed until they have a planting old enough to produce seed for future use. There is a list of seed sources in the publication *Ginseng Goldenseal and Other Native Roots* available at the Attra Web site (see references). Once growers have their own seed source, they



Figure 2. Stratified ginseng seed. All photos courtesy: Terry Jones



can harvest the red ripe berries and collect the seed for stratification or planting. De-pulp ginseng (seed) berries in a sack and either stratify or plant immediately. Never plant whole berries. Fruits should be collected before they shatter, mashed lightly, and fermented for one to two days in a bucket of water. The seeds should never be allowed to dry out. Ginseng seed has an 18- to 21-month dormancy. Fresh ginseng seed requires a cold/warm/cold cycle in order to germinate. There should be 45 days of temperatures below 36°F to meet ginseng's cold requirement. During stratification, ginseng seed should never be allowed to dry out or to become too wet. Ginseng roots themselves will not sprout without 60 days below 49°F.

### Stratification

A simple stratification unit for small quantities of seed is a pouch made from an old sock or a nylon stocking. For large quantities of seed, consider using a plastic bucket with 1/16-inch holes in the bottom and sides. Regardless of the size or construction, design the container to allow for good water drainage and to keep out rodents. Fill the container with alternating layers of seed and clean, moist sand, using at least twice the volume of sand as seed. Bury the bucket in a cool, shaded location (Figure 3) so that it is 2 to 3 inches below the soil surface. Mark the location well. Early the next spring open the container and check the seeds for decay, removing any that are soft. Stir the remaining seeds carefully to aerate them, make certain the sand is still moist, and rebury the container. If soil conditions are extremely wet or dry, check the stratification unit periodically. Many ginseng seeds will enlarge and begin to open after a year in storage. This is an indication that the seed is viable. In the fall, plant the ginseng seed as stratified seed. Keep the seed moist and protect it from drying during planting. Remember if it dries it dies.



### Planting Roots

Although root prices are considerably higher than that of seed, small ginseng roots can be transplanted and used as "seed" stock. Transplanting ensures a more uniform stand and reduces the time from planting to seed production. Plant ginseng roots at an angle (30 to 45 degrees from the vertical) in well-prepared soil with the bud one inch below the soil surface. Mulch the transplant plot with leaf litter. If transplanting requires several days, roots can be stored temporarily in a plastic bucket in a cool basement. Place a damp cloth on top and cover the bucket with a lid. Each day, stir the roots well or pour back and forth into a second container to aerate them and re-wet the cloth.



Figure 4. Washing and drying fresh dug ginseng.

### Considerations for Raising Ginseng

- Produce wild simulated or virtually wild ginseng.
- Know the risks which include: crop failure, diseases, theft, drought, rodents, deer and turkey depredation, and market price fluctuations.
- Start small and gain experience.

Ginseng is most commonly propagated by seed harvested from red berries on the plant during July and August. The ginseng stalk dies down every year, producing a bud scar on the underground neck that reveals the age of the root. Older roots are more highly valued in Asian markets and command premium prices. Because ginseng is a threatened species, roots must be at least 10 years old to be legally harvested and exported.



Figure 3. Ginseng seed stratification bucket.

### Digging and Drying the Crop

Fall-harvested roots will weigh more and will dry better. Wash the roots immediately after digging to remove dirt and debris. Ginseng should not be scrubbed because it lowers root value and causes the root hairs to fall off. After washing, allow the roots to drain on a screen for an hour or two, and then begin the drying process (Figure 4). Dry in a warm area where temperatures of 80° to 90°F can be maintained. Mature ginseng has 80 to 250 dry roots/pound. Try to preserve as many of the fibrous roots as possible. Roots will lose approximately 70 percent of their weight in drying.

### Economics

Although ginseng root has a high price per pound, wild ginseng in a forested environment is not a "get rich quick" scheme for the reasons previously mentioned. A projected budget and expected returns for a one-half acre plot of "wild simulated" ginseng is included on the following page.

### References -- Web Sites

- <http://attra.org/attra-pub/ginsgold.html> - Ginseng, Goldenseal, and Other Native Roots
- [www.ces.ncsu.edu/hil/spcrop-index.html](http://www.ces.ncsu.edu/hil/spcrop-index.html) - Fact sheets on ginseng and other woodland medicinal.

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**About the Author:**

**Terry Jones, Ph.D.** was a Horticulture Extension Specialist at the University of Kentucky. He is currently on a post-retirement appointment and is responsible for educational programs and applied research on small fruits, vegetables, and woodland medicinal herbs. He specializes in production practices and crops for limited-resource farmers.

University of Kentucky, Department of Horticulture; 130 Robinson Road, Jackson, KY 41339; Phone: 859.257.9511, ext. 234; Fax: 606.666.2215; E-mail: terry.jones@uky.edu

<b>Projected 9-Year Budget for 0.5 Acre of Wild Simulated Ginseng<sup>1</sup></b>		
Seed	10 lb @ \$75/lb	\$750
Labor	Site preparation and planting (125 hrs @\$10/hr)	\$1,250
	Biweekly inspection (500 hrs x \$10/hr.)	\$5,000
Materials and equipment	Rakes and shovels	\$50
	Backpack sprayer (\$125), fungicides, and rodenticides	\$200
Drying	Addition of insulation and drying racks to existing room or shed	\$400
	Energy cost to heat (0.50/lb of dried root)	\$40
<b>Total cost</b>		<b>\$7,690</b>
Expected yield	80 lb x \$410/lb <sup>2</sup>	\$32,800
Net revenue in 9 years		\$25,110
<b>Net revenue in 2000 dollars for 0.5-acre plot, assuming 4% rate of inflation.</b>		<b>\$17,641</b>

<sup>1</sup> Modified from USDA National Agroforestry Center: Agroforestry Notes: AF Note-5. Lincoln, Neb., July 1999.  
<sup>2</sup> Note that price can change drastically. The price in 2008 dropped to around \$285/lb, cutting net revenues by 30% (\$10,000).

**Advertisements**

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# Kentucky Champion Tree Program

## SWAMP CHESTNUT OAK — UDDERLY MAGNIFICENT

by *Diana Olszowy*

Although not a particularly common oak species in the central part of Kentucky, this swamp chestnut oak is a magnificent state champion. Measuring nearly 20 feet in circumference and towering to 125 feet in height, this behemoth specimen has stood the test of time against ice storms, floods, droughts, winds from Hurricane Ike, and even urban development in the Louisville metropolitan area.

As a member of the white oak family, which also includes chinkapin, chestnut, bur, and post oak, the swamp chestnut oak is native to bottomlands and wetlands in the southern and central United States. Its range is from New Jersey south to Florida and west to Missouri and eastern Texas. In Kentucky, the swamp chestnut oak predominantly resides in the western third where it can be found growing in floodplains along with sweetgum, cherrybark oak, blackgum, and pin oak. It resembles white oak in growth form, size, bark color, and wood quality, but its leaves and acorns are very different. The leaf of the swamp chestnut oak is often confused with chestnut oak, but it is fuzzy beneath and turns a rich crimson color in the fall. Swamp chestnut oak is normally a much larger tree than white oak which differs in preferred habitat, and its bark is thinner, scallier, and paler gray and does not have the distinctive deep, rugged ridging of the chestnut oak.

Swamp chestnut oaks are intolerant of shade, which means they prefer growing out in the open with no other woody competition nearby. As they mature, they actually exude a growth inhibitor through their roots which keeps other woody plants from becoming established. This ability is referred to as allelopathy, and very few woody species have this ability; black walnut and tree-of-heaven are the only known exceptions.

The wood of the swamp chestnut oak is used in many kinds of construction: agricultural implements, wheels, veneer, boards, fence posts, tight cooperage, baskets, and fuel. The quality of the wood is second only to that of white oak. This tree is known by many aliases such as “basket oak” because of its high-quality wood, which can be sliced into flexible strips suitable for basket weaving, and “cow oak” because of its large, relatively sweet acorns, which are readily sought after by deer, turkey, hogs, and cows. These acorns lack the bitter tannin chemicals found in most oaks and



*Photo courtesy: Diana Olszowy*

are even tasty eaten raw. Good seed crops occur at intervals of three to five years with poor to fair production in between.

Due to its ability to tolerate standing water for several weeks at a time and its predominantly moist soil preference, swamp chestnut oak also serves as an ideal urban tree. Often urban soils are compacted, which means the amount of oxygen in the soil is minimized. Tree species that thrive in “wet soils” are used to minimal oxygen levels. For this reason, other bottomland species such as baldcypress, blackgum, and sweetgum have proven to be excellent urban trees.

If you are looking for a multifunctional tree that is valuable for timber, wildlife, stabilizing soil, and producing excellent shade, this species is an *Udderly Magnificent* choice.

#### **About the Author:**

*Diana Olszowy is Stewardship and Education Branch Manager with the Kentucky Division of Forestry. She is also an editor of the Kentucky Woodlands Magazine.*

*Kentucky Division of Forestry, 627 Comanche Trail, Frankfort, KY 40601; E-mail: diana.olszowy@ky.gov; Phone: 502.564.4496; Fax: 502.564.6553.*



# Kentucky Woodland

## ***Conservation Stewardship Program - a great opportunity for woodlands in Kentucky!***



The Conservation Stewardship Program (CSP) is a voluntary conservation program that encourages agricultural and forestry producers to maintain existing conservation activities and adopt additional ones on their operations. CSP is administered by the Natural Resources Conservation Service (NRCS) and has a continuous sign-up so applications are accepted anytime. The next cut-off period will be established soon (likely to be mid-January with contracts entered early next spring) to evaluate and rank applications. More than 33,000 woodland acres in Kentucky have been allocated by the Chief of NRCS to annually be served by the new CSP.

The CSP is projected to pay \$6-12 per woodland acre based on acreage enrolled and conservation performance. To be eligible to apply to the CSP the operator of record must be in the Farm Service Agency record system (or establish it prior to application), have documented control of the land for the five year term of the contract, be in compliance with highly erodible land and wetland conservation provisions, and in compliance with average adjusted gross income provisions. The CSP may be right for you if:

- You are willing to commit time to inventory and document your conservation activities and production system to determine eligibility and ranking.
- You have records of your woodland management activities and are willing to continue maintaining records to document your conservation activities.
- You are ready to enter into a 5 year contract requiring you to apply additional conservation.

Woodland acreage applications for the CSP are separately ranked from agricultural applications and the ranking is based on what conservation practices and activities are currently being done as well as what additional conservation activities the applicant is willing to do. Applicants that meet two or more of the following statements are likely to be strong candidates for the CSP:

- My woodland is “green certified” by one of the following recognized programs: Tree Farm System, Green Tag, Smart Wood, Forest Stewardship Council, or Sustainable Forestry Initiative.
- I have implemented one or more improvements to my woodland in the past 10 years according to a written stewardship plan that was prepared with assistance from a certified/licensed natural resource professional.
- There is no apparent erosion on harvested or burned areas, roads, skid trails and landings.
- Native trees are appropriately stocked on the property and wildfire risk is minimized by strategically placed narrow fire breaks and wider fuel breaks.

To find out more about the CSP check out [www.nrcs.usda.gov/new\\_csp/](http://www.nrcs.usda.gov/new_csp/) visit your local NRCS office, or call 859.224.7350.

### **Answers to Test Your Knowledge on page 15.**

- A. Carpenter Bees
- B. Alleghany Mound Ants
- C. Trumpet Creeper
- D. Prickly Pear Cactus
- E. Bacterial Leaf Scorch

## ***Upcoming Dates To Remember:***

<b>Date:</b>	<b>Event:</b>	<b>Location:</b>	<b>Contact:</b>
Oct. 13 - Dec. 8	Fall Webinar Series	Various locations	see page 25
October 15	Win With Wood	Robinson Forest, KY	606.666.4116
November 2	Tree Farmer of the Year Field Day	Logan County	see page 13
November 12	Forestry Program: Hunt Leasing, Weed Control in Tree Plantings, and Forest Management	Adair County	270.384.2317

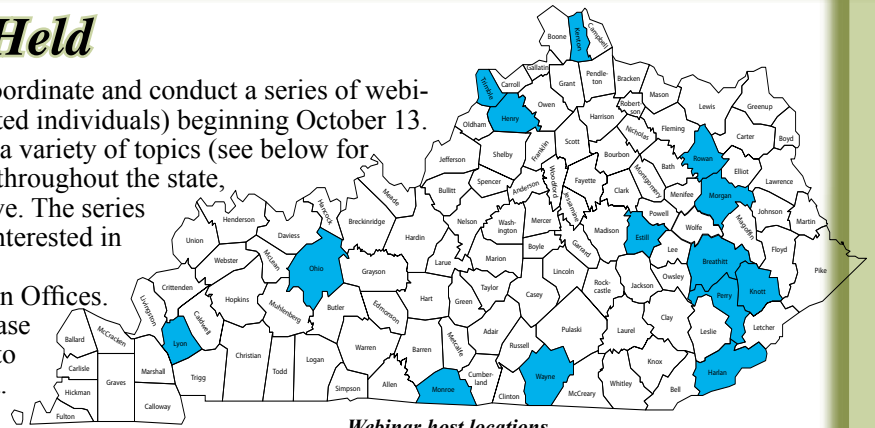
For more information about these programs, visit [www.ukforestry.org](http://www.ukforestry.org)

# News To Use

## Fall Webinar Series To Be Held

The University of Kentucky Forestry Extension will coordinate and conduct a series of webinars for Kentucky woodland owners (and other interested individuals) beginning October 13. Presenters from UK Forestry Extension will broadcast a variety of topics (see below for topics and host locations) to county Extension Offices throughout the state, allowing anyone to participate no matter where they live. The series is designed for woodland owners, farmers and others interested in woodland, timber and wildlife topics.

Registration will be handled by local county Extension Offices. Not all counties are participating in every webinar. Please call each location to register for the webinar you wish to attend and to find out where the webinar will be hosted. The topics and locations are as follows:



Webinar host locations

### Tree Identification - October 13

Kentucky has over 120 native trees and nearly 50 of these are commercially important for its wood industry. How can you learn how to identify all these trees? How can you learn how to identify any tree? Join other landowners from across Kentucky and learn the process and the skills needed to identify trees.

Hosting Counties: Henry, Knott, Lyon, Monroe, Morgan, Perry, Rowan, Trimble, and Wayne

### Wood Identification - October 27

Have you ever wondered whether that dresser in the antique store is really cherry, or wanted to know what kind of trees were cut down to make that old log cabin? In this class, you will learn the basics of wood structure.

Hosting Counties: Lyon, Monroe, Morgan, Rowan, Trimble, and Wayne

### Timber: Harvesting, Sales, Trespass, and More - November 10

Harvesting and selling timber could be one of the largest financial transactions a woodland owner ever makes and a poorly planned/conducted timber harvest can undo years of good management! Learn how to get the most from timber harvesting operations and how to protect yourself from timber trespass/theft.

Hosting Counties: Breathitt, Estill, Harlan, Henry, Knott, Lyon, Monroe, Morgan, Ohio, Perry, Rowan, Trimble, and Wayne

### Wildlife Management for Woodland Owners - November 17

Do you know the habitat requirements for various wildlife species, or your woodland's carrying capacity, how about limiting factors and how to alleviate them? During this webinar we will cover all that as well as wildlife habitat management tools used to achieve habitat management goals and sources of assistance for private landowners.

Hosting Counties: Breathitt, Estill, Henry, Kenton, Knott, Lyon, Monroe, Morgan, Ohio, Perry, Rowan, Trimble, and Wayne

### Invasive Species Identification and Control Techniques - November 24

Invasive species are a serious threat to Kentucky's woodlands

and natural areas. During this webinar you will learn how to identify and control a variety of invasive plant species types (ex. trees, shrubs, vines, grasses, and forbs).

Hosting Counties: Estill, Harlan, Lyon, Morgan, Trimble, and Wayne

### Non-Timber Forest Products - December 1

During this webinar we will cover a wide variety of non-timber forest products such as mushrooms, Christmas trees, craft materials, bees, and more. Learn how these non-timber forest products can help generate extra income.

Hosting Counties: Estill, Knott, Lyon, Morgan, Ohio, Perry, Rowan, Trimble, and Wayne

### Getting the Most from your Woodlands:

#### What you can do and who can help! - December 8

This program will cover the variety of management options available to Kentucky woodland owners, the organizations/agencies that can provide assistance (including cost-share \$), and generally how to get the most from your woodlands.

Hosting Counties: Estill, Harlan, Lyon, Knott, Monroe, Morgan, Ohio, Perry, Rowan, Trimble, and Wayne

Visit [www.ukforestry.org](http://www.ukforestry.org) for more information.

#### Webinar Host Extension Offices:

Breathitt County Extension Office - 606.666.8812  
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