History with Tree Rings
400 to 40
Staying Active
<table>
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<tr>
<th>Species</th>
<th>Size</th>
<th>Type</th>
<th>Price per 1000</th>
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<td>Seedlings</td>
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<td>Norway Spruce</td>
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<td>Transplants</td>
<td>$825.00</td>
</tr>
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</table>

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On the Cover
Fall color is at its best on the back roads of Ohio’s state forest lands. This scene at Scioto Trail State Forest in Ross County is just one place where we can enjoy a drive, casual walk, or hunting opportunity in a managed oak-hickory woodland. There are 21 state forests of mostly hardwoods covering more than 200,000 acres, producing valuable environmental and economic benefits we all enjoy. Photo by ODNR
Out In the Woods

It’s fall, with all of its activities, including woodland management. Wildlife stewardship practices are important to your tree farm.

Folks like to watch birds and other critters. Hunting is a popular pastime. You can put extra emphasis in managing your woods for wildlife. Woodlands attract different kinds of wildlife depending upon how they are managed. In addition to a forester, a wildlife biologist is an important person to involve in determining what needs to be done to your woods for it to produce the wildlife you desire. The Ohio Department of Natural Resources Division of Wildlife is a good place to start.

We’ve been busy at the farm. One thing about trees is that they occasionally fall down. We recently spent some time cutting up a big red oak. There’s a lot of wood in a 30-inch diameter oak!

In reviewing our spring walnut planting project, we have learned that we will need to do some more crop tree releasing. We have done some, but the walnut trees are going to need a bit more sunlight. It looks like we’ve lost about 60 of the young trees at this time.

Our timber stand improvement (TSI) vendor Raymond Yoder and his crew finished up a second go around in about 20 acres of our woods. The first day they focused on foliar spraying honeysuckle, and on the second day they focused on grapevines and Ailanthus that were missed last fall. During the week that Raymond was finishing our TSI project, Service Forester Adam Komar reviewed our 2019 TSI project with us. We looked over a 14-acre stand with the thought of doing some oak regeneration management. This may not work though if there is not enough understory oak. We will see once we get the application turned in for EQIP. To top it all off, Alex Kinder was in our woods to do our Tree Farm inspection. I learned a lot from this walk through. It’s great to be out in the woods!

The Ohio Tree Farm Committee has had a great fall as well. We have learned that Randy and Koral Clum have been selected as the National Tree Farmers of the Year for 2018! This is so exciting. It has been 29 years since John and Mary Schmidt represented Ohio as National Tree Farmers of the Year.

Jeremy Scherf held a training course for Tree Farm Inspectors, with six new inspectors trained. Cassie Ridenour is working to nominate four vacancies on the Ohio Tree Farm Committee. We would like to maintain and strengthen our relationships with the Regional Woodland Interest Groups throughout Ohio. We have learned that some changes are coming to the American Tree Farm Program. We’ll have more on that subject later.

The Paul Bunyan Show came off very well. OFA’s Brad Perkins, Gayla Fleming, and Denise Foster and their staff did a great job. In addition to a great show, our Flap Jacks for Lumber Jacks fundraiser was very popular. Thanks to Gene Sipos and Alex Kindler for all their work with...
Joe Gordy

We have learned of the passing of Joe Gordy on August 29, 2018; his wife Phyllis (PJ) having recently passed away July 1 of this year. After a career that included serving his country in both the Korean and Vietnam conflicts, Deputy Director of the B-52 Systems Program Office for the US Air Force, and as a realtor with PJ in the Dayton area, the couple retired to their Ross County tree farm. They became active in the Southern Ohio Forestland Association (SOFA), Ohio Woodland Owners Association, and the Ohio Forestry Association. Joe was chair of the Ohio Tree Farm Committee in 2002 and served on many committees over the years.

You two will be missed.

this project. They put together a great team and all their efforts were most appreciated. We also had a Tree Farm display at the show. Richard Rudy and Abby Kindler pulled together a lot of support for the booth and thanks to one and all. Our Tree Farm of the Year Tour held at John and Bess Lusk’s Whispering Ridge Tree Farm was a great success. Thanks to everyone for your support of this tour.

Thank you for all of your support of the Ohio Tree Farm Committee, and for all you do for woodlands here in Ohio! ♦

Contact Tom (419) 423-3422 or tvmills74@gmail.com. The Ohio Tree Farm website, as well as past issues of this magazine, can be found at https://www.ohioforest.org/mpage/OhioTreeFarmAboutUs.
Greetings! In October I was honored to induct outstanding individuals and organizations into the ODNR Division of Forestry’s Forest of Honor at Zaleski State Forest.

Dr. Richard (Dick) Potts was honored for his significant contribution to advancing private land forest management practices in Ohio, appreciably raising public awareness about the benefits of well-managed forests, serving as a mentor to numerous Ohio tree farmers, and serving as a leader of the Ohio Tree Farm Program. Dick passed away on May 27, 2010 at the age of 70.

The Wildlife Management Institute has been a strong supporter of the Division of Forestry’s mission over the last ten years, and actively promotes sustainable forestry practices in Ohio. The Wildlife Management Institute is a national organization established in 1911 by sportsmen and businessmen concerned about the dramatic decline of many wildlife populations. The
founders were interested in restoring and ensuring the well-being of wildlife populations and their habitats. It is a small, private nonprofit scientific and educational organization that works with government agencies, university researchers and educators, professional associations, and conservation organizations.

**Superior Hardwoods of Ohio** is very important to forestry in Ohio. They have been a leader in the forest industry for three generations, dedicating their careers to understanding Ohio’s natural history and forest resources. Superior Hardwoods of Ohio employs more than 150 people in four modern sawmills, and manufactures and processes more than 50 million board feet of hardwood lumber annually. They are a leader in the Ohio Forestry Association, certified with the OFA Master Loggers program, and follow Best Management Practices when harvesting timber.

**Mike Bailey** was recognized as a recent retiree of the Division of Forestry. Mike retired in November of 2017 after having worked for the State of Ohio for 30 years, more than 13 of those years with the Division of Forestry. He retired as the division’s fire training officer based out of the Ohio Fire Academy headquarters in Reynoldsburg, Ohio. Mike served as the liaison between the wildland firefighting team within the DOF and the Ohio Department of Commerce Division of State Fire Marshal. He started with the Department of Commerce in October 1987 and then transferred to ODNR Division of Forestry in February 2004.

**Thomas Berger** was recognized for having impacted forest management in Ohio as much as any one person ever could. Tom spent decades on the Ohio Tree Farm Committee serving in many capacities including Chair, Vice-Chair, Area Chair and Awards Chair. Tom has been a member of the Ohio Society of American Foresters for 45 years. He was the chair of OSAF in 1986, was named an SAF Fellow in 2005, and was given the OSAF Communicator of the Year Award in 2006. Several times Tom assisted disabled hunters, as a guide, during special events at Blue Rock State Forest. In 1986 Tom was a member of Ohio’s first mobilized interagency fire crew. Tom and his family own a 91-acre woods in Perry County. This property is recognized by The American Tree Farm System as a certified tree farm. There he implements the kind of treatments that he has advised for other Ohio landowners during his entire career. His service forester Adam Komar once said he had “never seen so many girdled trees in one place.”◆
In the last issue, I wrote about how to become a tree farmer by developing a compliant management plan and showing a qualified Tree Farm Inspector evidence of work toward that plan. Becoming a Certified Tree Farmer is an early step on a long journey. Growing a forest is a life’s work, and for most of us, staying with the Tree Farm Program is a life-long commitment.

To maintain your property as a Certified Tree Farm, you need to continue to progress along the plan. This may include removal of invasive species, or selective harvest events. For my tree farm it includes both, as we have never-ending battles with Ailanthus, and have a low thinning coming up this fall as a practice to help manage the property for oak.

You may be able to execute many of the practices in your management plan on your own: we do our own work on invasive species to keep grapevine, Ailanthus, Japanese barberry, and bush honeysuckle at bay. Some practices may be too strenuous or require too high of a skill level for the average family forest owner. For these practices, EQIP funding may be available. Your local NRCS office, ODNR service forester, or consulting forester can guide you through the application process and provide lists of people who are competent to perform work in your area.

The certified part of the Certified Tree Farm designation means that tree farms need to meet the Tree Farm Standards of Sustainability. The ATFS certification program is internationally endorsed by the Program for the Endorsement of Forest Certification (PEFC™). To maintain this certification, which provides recognition of Tree Farm products, we have a periodic inspection program on a five-year rotation.

Qualified Tree Farm Inspectors contact landowners to meet to review their management plans and activities. These inspections typically take a couple of hours

You can share The Ohio Woodland Journal with a school library. See page 34 for details.
and may be conducted on foot or by four-wheeler depending on the size of the property. These inspections provide a great opportunity for the entire family to get another qualified view of their woods. Since he was in kindergarten, I have taken my son to our tree farm inspections. Between these forays and two years at forestry camp, I am embarrassed to admit that my 18-year-old son is better at tree identification than I am!

Being available for inspections is a critical part of being certified. Every five years, we participate in a national audit, and a small number of tree farms are inspected by independent professionals. That is why we on the Ohio Tree Farm Committee have been working so hard to get current contact information from you and get current inspections for all tree farms in Ohio. Where we cannot contact folks, or where inspections indicate that management plans are not in place or are not followed, we have no choice but to decertify these tree farms.

Our Ohio Tree Farm Committee encourages you to keep in touch with us and your service forester or private forestry consultant, and we will endeavor to lead you to resources that can help you maintain and improve your woods and your certified status. ♦

Cassie Ridenour serves as Vice Chair of the Ohio Tree Farm Committee.

To plant a tree whose full beauty you will never know is one of the most eloquent ways of saying you think more of others than of yourself. – Greek proverb

You and Your Woods:

Staying Active as a Tree Farmer & Maintaining Tree Farm Certification

Cassie Ridenour, Monroe County Tree Farmer

Tree Farmers Otto (son) and Cassie Ridenour (mom) on a day of invasive plant control at their family tree farm in 2015.

Tree Farmer Cassie Ridenour (middle) on a forestry improvement trip in the 1960s.
## Woodland Interest Groups in Ohio

### Opportunities:
- Interesting Forestry Programs • Knowledgeable Speakers
- Monthly Newsletters • Training Sessions • Field Days

### Central Ohio Small Woodlot Interest Group
- Jason Van Houten
- ODNR Division of Forestry
- 2045 Morse Rd., Building H-1
- Columbus, OH 43229
- (614) 265-6703
- jason.vanhouten@dnr.state.oh.us

### East Central Ohio Forestry Association
- Jeremy Scherf
- ODNR Division of Forestry
- 2050 East Wheeling Ave.
- Cambridge, Ohio 43725-2159
- (740) 439-9079
- jerry.scherf@dnr.state.oh.us

### Killbuck Valley Woodland Interest Group
- Bob Romig
- 3511 Clearview Pl.
- Wooster, Ohio 44691
- (330) 345-5077

### Muskingum River Woodland Interest Group
- Jim Stafford
- 2769 Dresden Rd.
- Zanesville, OH 43701-1703
- (740) 453-4400
- jim72staff@gmail.com
- www.mrwig.org

### Northeastern Ohio Forestry Association
- James Elze
- 2145 Merle Road
- Salem, Ohio 44460
- (330) 337-8974
- neofa1972@gmail.com

### Northwest Ohio Woodland Association
- John Mueller
- ODNR Division of Forestry
- 952 B Lima Ave.
- Findlay, Ohio 45840
- (419) 424-5004
- john.mueller@dnr.state.oh.us
- Joe Pupeni
- Advanced Tree Health
- joe@advancedtreehealth.com

### Southeast Ohio Woodland Interest Group
- Perry Brannan
- ODNR Division of Forestry
- 360 E. State St.
- Athens, Ohio 45701
- (740) 589-9915
- perry.brannan@dnr.state.oh.us
- seeowig.weebly.com

### Southern Ohio Forestland Association
- Jim Meacham
- 4332 St. Rt. 776
- Jackson, OH 45640
- jmeach42@gmail.com
- (740) 998-2073
- OhioSOFA.org

### Southwest Ohio Woodland Owners Association
- Pat Migliozzi
- ODNR Division of Forestry
- 8570 East State Route 73
- Waynesville, Ohio 45068
- (513) 897-1082
- pat.migliozzi@dnr.state.oh.us

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The Ohio Forestry Association (OFA) has a great message to share about the strength of Ohio’s forest products industry. About the sustainable growth versus harvest of our forest resource. About the passionate, down-to-earth people growing, managing, and harvesting our trees, and those making valuable products from them. At the same time, we need to let people know that we have challenges, like higher than necessary forest land taxes, invasive plant and animal species harming our forests, a need for more professional management of our woodlands, and more market options for our products and by-products.

To increase the audience hearing and seeing this message, I take advantage of most opportunities that come along to speak to groups that may not know a lot about our association or industry. Sometimes those opportunities come in the form of an invitation to set up an informative display at an event.

Hopefully, the time and effort we put into these endeavors pays off in a few more people gaining a better understanding of the many benefits that our renewable natural resources provide. Following are some of the new outreach opportunities that the Ohio Forestry Association participated in this past year.

**Ohio Hardwood Furniture Market** – OFA staffed informational booths in April and September at events held by the Ohio Hardwood Furniture Market at the Holmes County Fairgrounds. We concentrated on educating the furniture manufacturers and retailers about Ohio’s renewable and sustainable hardwood forest resource.

**Turkish Wood Industry Delegation** – I recently spent two days with a group of wood industry business representatives from the nation of Turkey. I helped our partners from OSU Extension and Appalachian Partnership, Inc. introduce them to several OFA member companies to nurture productive business relationships.

Wood industry representatives from Turkey at Haessly Hardwood Lumber in Marietta, Ohio along with Jack and Steve Haessly, Brad Perkins from OFA, Frank Roberts from APEG, and Kelly O’Bryant from OSU South Centers. Photo by Kelly O’Bryant
Outreach in 2018

Wood Components Manufacturing Association – I was asked to speak to this group at their annual regional meeting held this year in Ohio about the state’s forest resource and the challenges facing us today. Many of the attendees at this dinner event were from out of state, and a few from out of the country.

County Auditors Agriculture Education Day – I had the opportunity to join our partners from the ODNR Division of Forestry to talk to Ohio’s county auditors about the importance of our woodland tax programs.

Amish Furniture Gallery Video Clips – I was asked to film several short segments on OFA, Ohio’s sustainable forest resource, the Master Logging Company program, invasive species, and other topics to be used in advertising for the Amish Furniture Gallery’s line of hardwood furniture manufactured in Ohio. The Amish Furniture Gallery is based in Colorado.

OSU Extension Retreat – I was asked to sit on an agricultural panel discussion at OSU Extension’s annual education retreat, where I had the opportunity to talk to a large group of educators about some of the issues facing our industry.

Art of Our Appalachian Woods – This was an art exhibit that lasted for two months at the Dairy Barn Arts Center in Athens. We set up a visual educational display containing some of the same information that we used at the Ohio Hardwood Furniture Market events.

Ohio Smart Agriculture: Solutions From the Land – I am now on the steering committee of this group that is working to provide a framework for solving agricultural issues in our state, including the issue of hunger that a significant percentage of our children deal with. I, and other forestry partners, have already addressed this group on a couple occasions to tell our good story.

More from OFA on page 14
John Dorka Retires from the Ohio Forestry Association

After a long career with the ODNR Division of Forestry, including several years as Chief of the Division of Forestry, John was hired in 2008 as the Executive Director of the Ohio Forestry Association (OFA). After eight years as the Executive Director and two years working part time for the association as the Master Logging Company Program coordinator, John officially hung up his OFA hat in May of 2018. John has vowed to remain active in the organization on a volunteer basis, especially helping with some of the political and landowner tax issues that he has had a special interest in for many years.

John is to be thanked and remembered for many things that he accomplished during his time leading OFA. A few of them include:

- Guiding the association from operating as a “stand-alone” organization, to being successfully partnered with an association management company for 10 years.
- Leading the association through the development of the OFA Foundation, and the Ohio Forestry Association, Inc., two distinctive segments of our organization.
- John continued to help build the Paul Bunyan Show into the great trade show that it currently is, in its relatively new location at the Guernsey County Fairgrounds.
- He worked through the legislative system to get the language changed in the Ohio Revised Code to include additional forest products, along with logs, being recognized in the agricultural variance for trucking weight limits.
- Another major accomplishment was his work with several partners in helping to defeat proposed timber theft legislation that would have inflicted many costly restrictions on forest land owners and loggers.

The next time you see John, please thank him for his service to the Ohio Forestry Association, and for his many accomplishments.

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Ohio Tree Farm Committee – USDA Delaware Lab Field Trip  

by Cassie Ridenour

On August 16, the Ohio Tree Farm Committee met at the USDA Northeastern Research Station Forestry Sciences Laboratory in Delaware, Ohio. The lab was originally built around 1960 to conduct research on the Dutch elm disease. Today it houses three research projects and a publication group.

The building consists of 39,000 square feet of space, containing offices, laboratories, a library, and other special purpose rooms. The lab complex, situated on 233 acres of land, includes a headhouse-greenhouse, warehouse facilities, and a pond in addition to the main laboratory structure. After our regular meeting, we had some fascinating presentations from the scientists in the lab. Among the many activities the lab is pursuing, we were able to observe the following:

- Analysis of emerald ash borers and their ability to penetrate different crossed types of ash trees.
- Grafting of ash trees to develop strains that are EAB resistant.
- Development of equipment for measurement of temperatures in forest fires.
- A tree cookie library – a history of Ohio trees over the decades.

These dedicated professionals are working hard to make sure Ohio’s forestry resources are healthy for generations to come. Much of the research has been carried out at Vinton Furnace State Forest for many years, as well as numerous other locations throughout the state. Their research publications are available to the public on www.nrs.fs.fed.us/pubs. We are lucky to have them looking out for us, our forests, and our futures.◆

Mary Manson discusses the ongoing emerald ash borer resistance experiment in the greenhouse at the Forest Service lab.
Brad Perkins listening to Joan Jolliff explain research gained from tree “cookies” at the Forest Service lab in Delaware, Ohio. Photos by the author.
Dendrochronology, or the use of tree rings to date wood, has been used in North America for more than 100 years. In fact, the science is largely a North American innovation that is now used worldwide to date timbers of historical significance as well as to date and reconstruct climate and ecological changes and where trees are affected by various earth surface processes. Tree-ring dating can document changes in glaciers, the timing of earthquakes, volcanic events, floods, and land use.

Early in the 20th century, Harvard astronomer A.E. Douglass was charged with establishing the Lowell Observatory in Flagstaff, Arizona. He had a long-term interest in sunspot cycles and hypothesized that tree rings in the American southwest might be sensitive to moisture change that, in turn, may be related to drought and ultimately could be linked to solar variability. He thus began the science of tree-ring analysis.

Douglass noted that patterns in the width of tree rings over time can be matched from tree to tree and that a tree-ring series could be developed from living trees and extended back in time (Figure 3) using overlapping dead wood. Furthermore, with the recognition that moisture in the North American southwest controlled the variability in the ring-widths, he also was one of the first paleoclimatologists (investigators of past climates) to use the tree-ring widths as an indicator of past moisture changes.

Remarkably, Douglass also began developing what are now the classic and ongoing studies in the American southwest on drought variability and providing a chronology for archaeological sites. This seminal work continues with dating timbers from Ancestral Puebloans’ ruins in the Southwest, and the tree-ring records are now vitally important providing a long-term context for the present drying of the American southwest.

The early roots of tree-ring science in Ohio was begun by Ed Cook, cofounder of the Lamont-Doherty Tree Ring Lab at Columbia University in New York. Initially trained at the University of Arizona, Cook has developed old-growth tree ring records from around the world over the past five decades including his pioneering work in the state of Ohio during the late 1970s into the early 1980s. Among the sites that Cook and colleagues developed old-growth ring-width chronologies in Ohio include the white oaks of Johnson Woods, Orrville, chestnut oaks at Stebbins Gulch in Holden Arboretum (Figure 1a), and the white oaks of Glen Helen in southwest Ohio. These early investigations are part of a larger, ongoing effort to understand drought in North America and include the seminal compilation of the North American Drought Atlas (NADA) that has allowed scientists and water managers to visualize the development of droughts and pluvials (wet times) of the past two millennia.

The successful aging of the wood by the Wooster Tree Ring Lab depends on these initial collections of tree-ring data from Ohio and the subsequent follow-up work updating the chronologies and discovering new old-growth remnants. There are an amazing number of stands of trees around the state that have been spared from the early 19th century land clearing; these include several oak stands that are on The College of Wooster campus (Figure 1b), those managed by the Ohio Department of Natural Resources (Johnson Woods), The Nature Conservancy (Browns Lake Bog) and The Wilderness Center in Wilmot (Sigrist Woods). The wood of these collections is stored at the individual tree ring labs and the ring width data is archived at the International Tree Ring Database maintained by the National Oceanic and Atmospheric Administration’s (NOAA) National Centers for Environmental Information.

How is the tree-ring dating done?
The hallmark of tree-ring dating is identifying the calendar date for each ring of a wood sample. This requires that the tree puts on one annual ring each year and that the rings are clearly discernible. Dating is done through careful sampling, polishing of the wood,
measurement of ring-widths, and matching ring-width patterns (crossdating; Figure 3). Most species used in analyses in northeast Ohio are oak, although hickory, ash, and chestnut and, in some cases, beech can also be used in dating.

Special dry wood borers are used to extract a core (5-10 mm in diameter) from beams. Coring is done by hand or using power drills (Figure 2b). This sampling allows cores to be removed, which are then mounted on wooden sticks and sanded to a high polish so that individual cells in the wood and ring boundaries are clearly visible under the microscope (Figure 4). It is crucial in the sampling and ultimately determining the calendar year of timber cutting that the outer ring of the tree is intact. An intact ring can be recognized by timbers having the bark on them or having a smooth surface that indicates that the bark has peeled off.

Typically, ten to fifteen core samples per building are necessary for a successful date. The cores are extracted and glued into wooden slots and sanded with progressively finer sandpaper until the cells of the wood are clearly visible. Ring-widths are then measured in most cases to the nearest 0.001 mm. The next step is the process of crossdating the samples with one another (Figure 3) by matching the annually-resolved ring-width patterns from one sample to the next.

Crossdating is done visually and with the aid of various statistical computer programs. The variation in the ring patterns is crucial to the matching, and in Ohio the variability is primarily due to changes in summer precipitation that determines if the ring is wide (wet year) or narrow (dry year) (Figure 3). Once the cores are internally matched to one another, the ring patterns are compared with a master series that is calendar dated. Calendar-dated master

(Continued on page 22)
Figure 1 – Examples of old growth trees in Northeast Ohio. a – Example of an old growth chestnut oak from the Holden Arboretum, Kirtland, Ohio. The spiral-corkscrew morphology of the tree is typical of the older trees in this stand. This site in Stebbins Gulch has the oldest living documented tree in Ohio with an inner ring date of 1608 CE (407 years old). b - Old growth white oak from the College of Wooster campus. This tree is over 350 years old and is a member of a remnant forest that once covered much of the Wooster region. Note the restricted canopy and few heavy upper limbs, which are often indicators of age. All figures furnished by the authors.

Figure 2 – Collage of photos showing sampling of living trees using an increment borer (2a). A dry wood borer on a power drill and extraction of a core from a beam (2b). Cores and a section mounted and ready for analysis (2c), and measuring ring-widths in the Wooster Tree Ring Lab (2d).
**Figure 3** – Diagram of the essential principle of tree-ring research. Crossdating ring patterns extracted from the cores taken from historical buildings (a) are then matched to ring-width patterns from living tree-rings of known calendar date (b).

**Figure 4** – Photos of tree cores (both white oak) showing the outer rings of two crossdated historical structures. a – the fully-formed outer ring of a sample from the Beall House (now the home of the Wayne County Historical Society, Ohio). The date of 1816 on the outer rings indicates the tree was cut after the 1816 growing season, likely in the winter of that year. b – The partially-formed outer ring of this sample indicates the tree was cut in the spring or early summer of 1865.
series are the chronologies derived from the old growth stands of Ohio.

For those familiar with analytical error in science, once the sample is dated, the dendrochronologist can claim to know the year of cutting plus or minus an error of zero. Once dates are assigned to each ring, the completeness of the outermost rings can be assessed to determine the season the timber was cut. Tree rings consist of earlywood and latewood in diffuse-porous species like oak, and in the case where the outer ring is complete (both earlywood and latewood are present), the timber was cut after the growing season of the calendar date of that ring. Thus, the timber was likely cut in the late fall or winter of the growth year. If the ring is partially formed, then cutting occurred in the spring or early summer of the growing season (Figure 4b).

Once tree-ring width series from buildings are dated to the calendar year, the ring-width data from the historical building can be incorporated into the master tree-ring chronology for further dating. Additionally, as the ring-width variations are an indicator of past moisture changes, these data are used to reconstruct past changes in drought and are incorporated into drought modeling efforts such as the North American Drought Atlas.

The Wooster lab continues to amass tree-ring series from living trees and wood from historical structures while we collaborate with other scientists interested in the drought and ecological history of the region. Individuals and organizations who wish to have their buildings tree-ring dated can contact us at The College of Wooster Tree Ring Lab (https://treering.voices.wooster.edu) or gwiles@wooster.edu.

During the summer of 2018, the authors and students in the Department of Earth Sciences were supported by The Sherman Fairchild Foundation and AMRE (Applied Methods Research Experience) who provided funding for the tree-ring dating project in northeast Ohio. We are grateful to our clients during this project that included The Nature Conservancy, Holden Arboretum, Barnes Preserve (Wooster), The Wilderness Center, Sonnenberg Village, and various homeowners.

Greg Wiles is the Shoolroy Chair of Natural Resources and director of the Wooster Tree Ring Lab in the Department of Earth Sciences, The College of Wooster. His research focuses on glaciers and tree rings in the North Pacific and the Midwest. Nick Wiesenberg is the technician for the Department of Earth Sciences; he is an expert in tree-ring dating and performs much of the historical dating in the Wooster Tree Ring Lab.

Further reading and references cited


Alan Walter had his Carroll County barn dated by the Wooster Tree Ring Lab in February 2018. White oak timbers were dated to 1846 and were deemed to be repurposed from an older log cabin as floor joists in this barn. Hickory and red oak sampling results indicated late 1875 harvest dates. Alan’s barn was determined to be constructed in 1876 from these materials. Alan serves on the Ohio Tree Farm Committee and The Ohio Woodland Journal Editorial Board, and he was the 2015 Ohio Tree Farmer of the Year. Photo by Alan Walter.
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Tree Cookies

One way to learn about tree growth is to look at annual rings. Tree rings show patterns of change in a tree’s life as well as changes in the area where it grows. In this activity, you can trace environmental and historical changes using a cross section of a tree, or “tree cookie.”

Have you ever counted tree rings? Every growth season, a tree adds a new layer of wood to its trunk and limbs. This means you can determine the age of a tree by counting its layers, or rings. Have children learn more about a tree’s life by examining a tree cookie and asking:

- How old was this part of the tree when the tree cookie was cut?
- Can you see different markings? Evidence of scars or narrow, misshapen rings?
- What might have happened to the tree to cause these different markings?

Use a hand lens to get a closer look at the tree cookie’s texture. Can you see any holes or channels that might allow water and nutrients to travel up the tree? Finally, ask children to draw a tree cookie the same age as themselves. What can they do to show when important events in their lives took place?


Do this word search puzzle to discover some components of trees and forest cycles. Look below for the answers.

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Make Learning Fun!

For more activity ideas and materials, attend a PLT workshop:
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Recently, I was fortunate to check off Banff National Park in Alberta, Canada from my vacation bucket list. If you’ve never been, I highly recommend it, especially the gondola ride up to Sunshine Village, which drops you off on mountains with hiking trails leading off in all directions.

It was at one of our campsites, as I was laying in our hammock stretched between two pines, that the subject of this article came to my attention. Red squirrels have a range of abundance that stretches across the northern parts of North America, extending south to follow the Rocky and Appalachian mountain ranges. Given their common presence in boreal coniferous forests, the feisty little rodents were quite abundant in our campsite. I watched as two red squirrels—chattering like mad—chased each other across the pine boughs. This ended up being our daily dinner entertainment during our four-night stay at that campsite. There’s nothing like dinner with a show!

It’s not necessary to visit Banff to see red squirrels. We have them here in Ohio, where we see them most often in mixed deciduous and coniferous forests. However, they have adapted to a wide range of forest types, including urban and suburban woodlands.

Red squirrels live up to their name. Their fur is a reddish-brown, with white undersides and a noticeable bright, white eye-ring. The bright eye-ring, along with their smaller size and red coloring, is an easy way to distinguish red squirrels from Ohio’s other tree squirrels. Red squirrels often have flatter tails than their gray and fox squirrel cousins, and may develop ear tufts during winter.

The life of a red squirrel

We all think of squirrels as notorious acorn lovers and nut hoarders. This is no less true of red squirrels, although they tend to hoard more coniferous cones than other Ohio squirrels. In addition, they can be quite carnivorous in the absence of mast (berries and nuts from trees), consuming small rodents, eggs, and nestling birds. They are also fungivores, and in certain parts of their range such as the Cascade Mountains, they have been documented to have more than 45 different species of mushrooms in their diet.

Red squirrels breed one to two times per year in Ohio, in early spring and again in mid-summer. During mating season, red squirrels undergo a scramble competition
Did You Know? Do you remember the horse of a different color from the Wizard of Oz? There are squirrels of a different color, too! Ok, not green or purple, but definitely white and black. Black squirrels are often gray squirrels, and white squirrels may be any species. Albino squirrels (complete lack of pigment) are confirmed by their red eyes. Leucistic squirrels (partial lack of pigment) may be all white, or have patches of white, but their eyes are not red.
mating system, which describes quite well the pursuant, sometime erratic chases of two or more squirrels during the spring. Female red squirrels are only in estrus for a single day per breeding season, so it’s no wonder the competition is fierce. After mating occurs, the females are on their own to birth and raise an average litter of four pups, roughly 35 days later.

For nesting, red squirrels prefer cavities; but if lacking, they will construct leaf nests called dreys. The most attractive features of a nesting tree, aside from the presence of a cavity of course, is its proximity to the squirrel’s food cache and a large, wide branching tree that provides plenty of access (and escape routes) to the tree canopy. Once the pups are weaned a little over two months later, they are cast out to find their own slice of forest to defend.

Speaking of defending territories, the feisty behavior of red squirrels serves them well in maintaining territories. Red squirrels will readily defend their territories from competitors, especially in fall when they are building up winter food supplies. They will chase away intruders, such as other squirrels and even blue jays, attacking them with teeth and claws if needed. You have no doubt heard the alarm call of a red squirrel. It’s loud, piercing, and denotes that you have entered a red squirrel’s territory. Often the offended squirrel will scamper up a nearby tree and continue to call while flicking its tail.

Red squirrels cache food in different ways. In the cooler, northern parts of their range, red squirrels are primarily larder hoarders. This means that they have a just one or a few main caches of food, rather than many small caches scattered around (think of gray or fox squirrels burying a single nut). These large caches are called middens. Having just one or two middens makes it easier for the squirrel to protect it against intruders. While the size of a midden will vary from squirrel to squirrel, some can get rather large, as they need to last one to two seasons.
Perhaps at this point you are wondering why you’ve never come across a mountain of cones or nuts in your woodlands? In the east, up to 85 percent of hoards by red squirrels are scatter hoards (again, think of gray or fox squirrels burying a single nut). So here in Ohio, most red squirrels store winter food supplies much the same way as other tree squirrels – a little bit here, there, and everywhere. This system of food storage does have its disadvantages, however. Smaller middens mean smaller food supplies. More middens also increases the chances of those food supplies never being found again. This of course, is all part and parcel of how forest ecosystems function – the lost nuts are left to germinate.

Signs to look and listen for

Red squirrels are diurnal, making it one of few mammals we easily catch a glimpse of. Their activity increases as winter approaches, as acorns, cones, and other nuts must be stored to survive the cold months. Look for rare middens, nests in cavities or amongst the tree tops, and by all means, listen for their territorial chattering and alarm calls.

Wrapping it up

There are many woodland wonders wandering your woods, but sometimes squirrels are overlooked because they are so common. I encourage you to take a few moments to stop and watch them for a bit, especially the feisty, territorial red squirrel. Few mammals give you such an insight into their lives and daily activities as does the squirrel. Happy wanderings!

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Over the past decade, I have been lucky enough to work with a variety of landowners. Landowners have different backgrounds and goals which shape how they view and manage their land. As all of us who work with landowners agree, you never know what you are getting into when you answer the phone and make that first visit, but that is what makes it fun.

Landowners who are particularly unique are those who want to plant a walnut plantation. The reasons for planting walnuts usually fall into three categories; “I want to make money,” “I want to make money for my kids,” or “I don’t want to farm this field anymore, but I still want to make money.” I’m joking of course, but there usually is some financial motivation for choosing walnut over doing a diverse species tree planting.

Historically, black walnut has been one of the highest valued trees. There is no reason to expect this to change, so it is a legitimate reason to plant a walnut plantation.

Going back to my comment about how a landowner’s background shapes their management motivations, they need the drive to actually do the work necessary to have a successful walnut plantation. This type of planting is not a case where you can just buy some seedlings, put them in the ground, and hope for the best. Considerations include: finding a good site for planting, deciding on spacing, timing of initial pruning, and then implementing crop tree release thinnings to ensure even and consistent growth--all while optimizing the rotation cycle. Those parameters will cause most folks to glaze over and bid me a good day, but some cling to every word and want the next available appointment.

These eager landowners are the ones that I soon recognize on my caller ID, because they have lots of questions and lean on the forester’s education to guide them through the process. The first couple of years are very busy in the process of developing a plantation, but once the trees get established and growing, the need for the forester is minimal other than the occasional pruning question. When the trees become pole sized, this triggers a call to the forester to determine if it is time to mark the first crop tree release thinning.
Crop tree release marking in a walnut plantation is one of those times I must put on both a forester’s and a therapist’s hat. Hours, days, weeks, and years have been spent doing site preparation, planting, replanting, vegetation control, corrective pruning, and watching the trees grow. It is easy early in the process. The poorer quality trees stand out and it takes very little convincing that those are the trees that need to be cut to allow for steady growth in the better crop trees.

The second thinning is more difficult, but defects can be found, and trees not growing quite as fast can usually be identified. Still, some difficult decisions need to be made. After this thinning, the forester may no longer receive a Christmas card...

How many fellow foresters have marked a final thinning in a walnut plantation leaving only 40-50 trees per acre to grow to financial maturity? I haven’t. I have marked many in 15 to 20-year-old pole-sized stands but taking that next step for many has proven to be a breaking point.

For those landowners who are in this difficult situation of moving forward to optimize the growth of your black walnut plantation but not having the heart to cut another tree, you are not alone. There are “support groups” such as Ohio Certified Tree Farmers, the Ohio Walnut Council, the Ohio Nut Growers Association, and local landowner groups who have members trying to reconcile the decision to thin or not to thin. Your forester is also on your side even if you don’t like what they have to say.
The title of this article 400 to 40 refers to roughly the number of trees (per acre) a typical plantation starts with and then the number left before the final harvest. I wonder if the number of landowners, or their families, who actually see a plantation all the way through from planting to final harvest isn’t roughly the same—400 to 40. Even if a landowner doesn’t go all the way to a harvest, it is a lot of fun as a forester getting to know these landowners and watching as their plantations grow. And to quote the famous words of television’s Red Green, “Remember, I’m pullin’ for ya- we’re all in this together.”

Casey Burdick began her new position as the City of Lebanon Recreation and Natural Resources Coordinator in February. She recently served as the ODNR Division of Forestry Service Forester for landowners in Clark, Darke, Miami, Montgomery, Preble, and Shelby counties. Casey remains active on the Ohio Interagency Fire Crew, and is the outgoing Chair of the Ohio Chapter of the Society of American Foresters.
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**East Central Ohio Forestry Association**

The East Central Ohio Forestry Association recently hosted Rome Marinelli (far left, standing) of the Sustainable Wildlife Area Restoration Movement. Rome’s subject was the horror of the Bradford pear tree. While the original intent for introducing this tree into the United States may have had merit, it has recently become a pest. It is fast growing, has attractive flowers in the spring, and it doesn’t outgrow most of the places it has been planted. The original cultivar was known as Callery pear and seemed to pose no threat since it was sterile and could not become invasive.

However, other cultivars were developed, as is the habit for many well-meaning horticulturists, and thus was born a fast-multiplying and highly invasive weed tree. Many road berms have been inundated with these trees, choking out native vegetation and occupying sites far beyond where they were planted. With no natural controlling factors to limit its spread, there doesn’t seem to be any economical means to prevent its spread. Rome’s organization helps native pollinators, particularly bees. Many invasive plants have disrupted the life cycles of these critical pollinators.

The bottom line to this message: **do not plant Bradford pear or any of the cultivars of this species!**

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**Northwest Ohio Woodland Association**

The NWOWA meets four times a year and the last meeting of the year was Saturday, October 20, 2018 at the R.A. Stranahan Arboretum in Toledo. The University of Toledo’s Stranahan Arboretum is a 47-acre site that consists of cultivated ornamental trees, rolling lawns, natural woods, ponds, wetlands, and prairies. It has an exquisite collection of rare and local trees, shrubs, and grasses. There are approximately 800 specimens of cultivated, mature trees from areas as far-flung as China, Serbia, Japan, and Norway. North American native varieties range from the bristlecone pine to our own down-home favorite, the Ohio buckeye. The group saw new and old growth forests, a prairie and succession plot, a pond and wetland areas, and a unique ravine area.

Meetings include secretary, treasurer, and other committee reports along with updates from the Ohio Tree Farm Committee and ODNR service foresters. The 2019 program schedule was reviewed. The proposed programs include Urban Forestry, Woodlands and Taxes, Managing Your Woods, and Sawmill Operation. Dates will be announced soon.

For more details on the Northwest Ohio Woodland Association and future meetings, contact Keshia Krout at (419) 424-5004.
Hello again from northeast Ohio. Nearly 50 NEOFA members and guests visited the Beaver Creek Wildlife Education Center for a potluck picnic and tour in July. The evening started with some socializing, followed by a delicious meal, and ended with a tour of the Wildlife Center. The center recently completed a new addition to make room for more marvelous displays. Thanks to Kathy Cattrell and all the volunteers for a fun and educational visit. We also want to thank Jeannie Lanave for coordinating the food for the evening.

The NEOFA Informational and Educational booth for the Canfield Fair got a bit of a face lift this year with some new banners, picture board, and a new NEOFA sign. Thanks go out to Charlie and Annette Woodrum for donating their time and talents to make these new items possible. Of course, we can’t forget Dave and Nancy Hively and all their coordination to make sure the booth was staffed with member volunteers and professional foresters. The fair booth is a great opportunity for us to share knowledge about proper forest management with the public.

On September 22, the NEOFA Informational and Educational display was set up at the Leetonia Sportsman Club Kids Day. This event is a great opportunity to introduce students to Camp Canopy and the sponsorship offered by the NEOFA.

Our Chainsaw Safety and Felling Clinic resumed in September as well. These clinics are a great way to provide folks with training, giving them the confidence to be more actively involved with the work required to maintain their woodlots.

Our indoor meeting schedule resumed in September with a talk on chainsaw maintenance by Bob Baker and Nate Martin from Hill Top Lawn and Garden. The meeting in October will feature a panel discussion on tree planting with ODNR Division of Forestry District 3 Manager John Kehn, Service Forester Ryan Clester, and Consulting Forester Jim Elze. We finish out the year in November with a presentation by Alan Walter about his barn relocation project. We will also elect officers and directors at this meeting.
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</tr>
<tr>
<td>1/2 pg. (9”H x 7 3/4”W)</td>
<td>$300</td>
<td>$1,000</td>
</tr>
<tr>
<td>1 pg. (10”H x 7 3/4”W)</td>
<td>$500</td>
<td>$1,750</td>
</tr>
</tbody>
</table>

We Buy White Oak Logs!

Independent Stave Company welcomes all white oak suppliers!

- Top prices for your logs
- Experienced log buyers
- Professional service

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Protecting the Environment

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Through our sustainable woodland management programs of 170,000 forested acres, we have planted more than 63 million trees, enhanced wildlife habitats, and provided in excess of 108 million feet and 1.3 million tons of wood products to the forest manufacturing industry. Our ReCreation Land, a 60,000 acre tract of reclaimed land, offers public recreation—free of charge—to those who love nature.

AEP’s long-standing partnerships with the Ohio Department of Natural Resources and other organizations help us fulfill our mission of caring for our customers, building strong communities, and protecting the environment.

To learn more, visit http://www.aep.com/environment/
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Dated Material Enclosed

If you can't see the forest for the trees, work with a Glatfelter forester to get a clearer picture.

Glatfelter's Landowner Assistance program. Working with private landowners to provide good forestry practices.

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