The OHIO WOODLAND Journal

Volume 28 • Number 3 • Summer 2021

A PUBLICATION OF THE OHIO TREE FARM COMMITTEE

- American Chestnut: ID, Restoration, Historical Distribution
- Understanding the Basics of Silviculture
- Wild Wonders: Buteos

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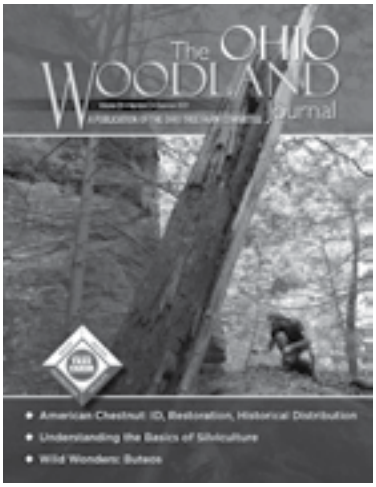
INSIDE THIS ISSUE



On the Cover

The decomposing remains of a large American chestnut at Canter's Cave 4-H Camp with Nick Wiesenberg from College of Wooster. Photo courtesy of Dave Apsley

ohioforest.org/mpage/OhioTreeFarmHome

View from the (lawn) Chair

The sun is out, and so are we. At the time of this writing, the days are long. Tree farmers are spending lots of time outdoors, and they are beginning to gather again.

On Earth Day this year, we went to see Paul Mechling, 2020 National Tree Farmer of the Year Finalist, give an Earth Day speech at the Buccia Vineyard in Conneaut, Ohio. His speech was followed by live music from A Touch of Gray, a Grateful Dead tribute band. It was great to get outside again. Paul has not let the pandemic slow him down, and in addition to planting trees on his property, he helped the folks at the vineyard plant grapevines using his tree planter. So far this year, he has planted 17,300 trees (5,300 on their family land) and 3,100 grapevines. He checked on the grapevines last weekend and reports that they already have six to eight inches of growth!

On Arbor Day, Governor Mike DeWine dedicated a COVID-19 Pandemic Memorial Grove at Great Seal State Park. The grove, which overlooks the view that inspired the Great Seal of the State of Ohio, includes white oak, swamp white oak, red oak, chinquapin oak, hackberry, sugar maple, redbud, and dogwood. For the dedication, the Governor assembled a group of COVID-19 survivors, first responders, elder care workers, health care workers, and Ohioans who lost their nearest and dearest to COVID-19. Brad Perkins from OFA and I were glad to be there as friends of the forest. At the time of this article, more than 20,000 Ohioans have lost their lives to COVID-19. In the dedication, the Governor said, "While no memorial can fully encompass the grief caused by this pandemic, we hope this grove will not only offer some solace to those who lost loved ones, but also serve as a reminder of the

Covid Memorial Tree Planting at Great Seal State Park. From left to right are Brad Perkins, Cassie Ridenour, First Lady Fran DeWine, Dan Balser, Governor Mike DeWine, Walt Smith, Barry Gierard, and Eric Roush.

CALENDAR

AUGUST

13

A Day in the Woods 2nd Friday Series**
New Woodland Owner Program: The ABC's of Owning and Caring for Your Woodland

28

2020 Tree Farm of the Year Tour
Brammer Family Tree Farm
Contact Ryan Clester for information and directions at Ryan.clester@dnr.ohio.gov

SEPTEMBER

4

Northwest Ohio Woodland Association Meeting
For more details on the Northwest Ohio Woodland Association and future meetings, contact Tom Mills at (419) 721-1465.

10

A Day in the Woods 2nd Friday Series**
Invasive Plant Identification and Control

Cassie Ridenour
Ohio Tree Farm Committee Chair

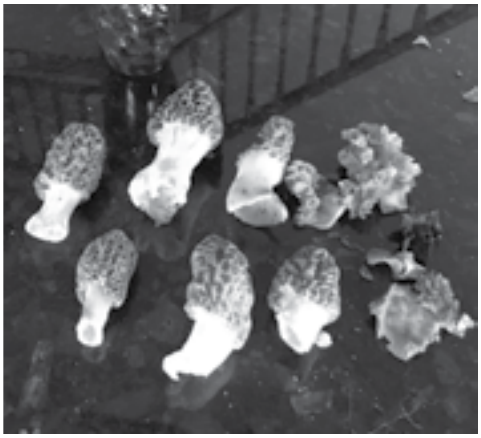
courage and endurance of all Ohioans during this unprecedented time in our lives."

The 2020 (yes, 2020!) Tree Farm of the Year Tour is planned for August 28, 2021, on the Brammer Family Tree Farm in Columbiana County. The Brammers have a beautiful property and have worked hard on woodland management, particularly the control of oak wilt. While you may have seen their virtual tour last year, we are delighted to be planning an in-person tour for this incredible tree farm.

Around our own properties, we had a great mushroom season, and my son helped me with a raised bed fabricated with wood from our sawmill. My son Otto is interning this summer for the American Forest Foundation and is involved with the White Oak Initiative and the Family Forest Carbon Project. Both may benefit Ohio forests and forest owners. Keep an eye on these initiatives at forestfoundation.org.

Finally, I would like to note that we are launching a new survey to woodland owners in Ohio. This will come out electronically and through the next *The Ohio Woodland Journal*. The goal is to better tune programs to meet the needs of our constituents. We want to hear from you about what you want to know. We will work to launch education efforts on these topics at the Paul Bunyan Show, the annual meeting, and field days such as the Tree Farm of the Year Tour. I hope to see you there! ◆

Wood framed garden bed at Cassie's Piney Fork Tree Farm.



Morel mushrooms from Piney Fork Tree Farm.

SEPTEMBER

11
Ohio Chapter, The American Chestnut Foundation, Annual Meeting Cambridge, Ohio
Contact Stephen Rist at (740) 272-8519

15
Lumberman's Outing
For more details visit ohioforest.org/page/Lumbermansouting

21-23
Farm Science Review
Molly Caren Agricultural Center, London, Ohio
fsr.osu.edu/home

OCTOBER

1-3
Paul Bunyan Show
ohioforest.org

8
A Day in the Woods 2nd Friday Series**
Woodland Practices: A Tour of the Vinton Furnace State Forest Demonstration Plots

23
Hocking State Forest Fall Color Tour
(740) 385-4402

*****All A Day in the Woods 2nd Friday* Series** are designed for woodland owners and enthusiasts, and they take place at Vinton Furnace State Forest and other southern Ohio sites.
Pre-registration required. u.osu.edu/seohiowoods or (740) 596-5212. Program details and updates will be posted at u.osu.edu/seohiowoods as they become available. Contact Dave Apsley apsley.1@osu.edu for more details.

Check the OFA/Tree Farm website for Tree Farm Inspector contact information: ohioforest.org/mpage/OhioTreeFarmHome

PERSPECTIVE FROM ODNR

COVID-19 Pandemic Memorial Grove sign at Great Seal State Park.

SUMMER GREETINGS

This past Arbor Day, April 30, I was honored to participate with Ohio Governor Mike DeWine and Ohio Department of Natural Resources Director Mary Mertz in the dedication of a new memorial tree grove in honor of the victims and survivors of COVID-19, as well as all Ohioans who made personal sacrifices to protect others amid the coronavirus pandemic.

The COVID-19 Pandemic Memorial Grove is located at Great Seal State Park in Chillicothe and includes a grove of 15 newly planted trees

Dan Balser
State Forester and Chief
ODNR Division of Forestry

TO YOU ALL!

surrounding a paved trail. Great Seal State Park was selected for the memorial tree grove due to its rich history and central location. In the early 1800s, the rolling terrain in the area inspired the hills depicted in Ohio's state seal.

During the dedication ceremony, Governor DeWine, First Lady Fran DeWine, and Director Mertz planted the first tree in the new grove. The remaining trees were planted by COVID-19 survivors, families of Ohioans lost to the virus, healthcare workers, first responders, teachers, students, local community leaders, and other essential workers.

The trees selected for the memorial grove are all native to Ohio, including five white oaks, three redbuds, and one each of swamp white oak, northern red oak, chinquapin oak, hackberry, sugar maple, red maple, and flowering dogwood.

I am very thankful for the hard work of Division of Forestry staff members and other ODNR employees who spent many weeks planning, preparing, and coordinating the creation of this memorial tree grove. I hope that you have a chance to visit it. ◆

Subscription Form

The Ohio Woodland Journal

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ODNR Division of Forestry
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jeremy.scherf@dnr.ohio.gov

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ODNR Division of Forestry
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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.ohio.gov

The Ohio Forestry Association Annual Meeting Landowner sessions can be found on the Ohio Forestry Association YouTube Channel.

Ohio Timber Market UPDATE

(As of mid-June, 2021)

Brad Perkins
OFA Executive Director

The hardwood lumber market remains very robust, with a few lumber species selling at historically high prices. However, the rapid price increases of some species have started to slow down or level off.

These prices have risen because of lumber demand, both domestically and abroad, which has increased dramatically over the past 9-12 months. Most industry experts believe that demand will remain strong for some time for a couple of reasons. One is that home construction and renovation is thriving due to many people having more disposable income right now, combined with low interest rates. Another reason is that the logging, sawmilling, and manufacturing sectors still do not have enough workforce to produce the volume of products needed to meet the demand.

My contacts tell me they are starting to see some changes in the bidding process as it relates to landowners selling their timber. While landowners are still getting good prices for their timber, loggers have been buying so much timber due to demand that they may be getting saturated with uncut timber. This is leading to fewer timber buyers bidding on projects or for buyers and loggers requesting longer contract periods to harvest the timber. Some timber buyers may be hesitant to purchase too much timber at these currently elevated prices in case the log market moves downward before they get it cut.

Because of these factors, it is good advice to get the assistance of a professional forester to help develop a good contract for your timber sale and to request the use of an Ohio Master Logging Company to conduct the harvest. ◆

Connecting Kids to Nature

Nature is a great teacher and getting kids outside to learn and play is good for their brains and their bodies. Try this outdoor activity from Project Learning Tree® – it's safe, fun, and educational!

Looking at Leaves

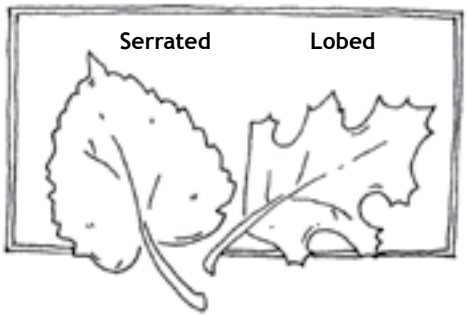
In this activity, children will take a closer look at leaves and find out more about leaf characteristics and how leaves can be used to identify plants.

The next time you are in a forested area, have children collect leaves of various shapes, sizes, and colors from the ground. Conduct a comparison investigation by asking:

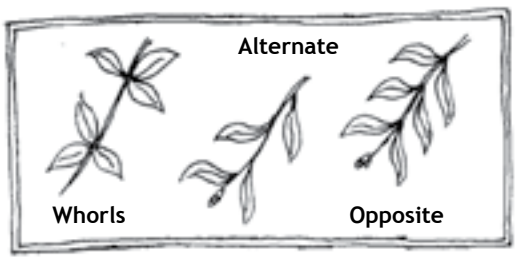
- What differences and similarities can you see?
- What do the leaves feel like? Do they have hairs? Or teeth?
- Can you find the tree that each leaf came from?

Explain that leaves can be used to identify trees. Use a field guide to identify a tree. Find a leaf from that tree, and compare the leaf structure described in the field guide to the real-life specimen you found on the ground. How many other trees can you find with this same type of leaf?

Leaf Margins



Leaf Arrangements



The edges or margins of leaves can provide clues to the tree's identity. Another characteristic to identify a tree is the way its leaves are arranged on the twigs. Even needle leaves grow in patterns. For example, leaves on pines may grow in clusters of two, three, or more.
Have children make prints of the leaves they collect. To make a leaf crayon rubbing, place a leaf on a smooth, hard surface, vein side up, and cover it with a piece of paper. Rub a crayon back and forth across the paper, directly above the leaf. What do you see? The leaf's margin and veins will appear on the paper as you rub.

Make Learning Fun!
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- Visit shop.plt.org

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www.plt.org

LEAFING OUT: AMERICAN CH

As discussed in other articles in this issue, tree-sized American chestnuts (*Castanea dentata*) are almost nonexistent in Ohio. In contrast to the majestic giants that once grew throughout much of the eastern United States, most of today's naturally occurring American chestnut trees are found in the form of small sprouts from the surviving root systems of their predecessors. Although not common, they still occur throughout the original range of the species. When these sprouts receive additional sunlight after neighboring trees die or are harvested, they can grow rapidly for a few years. Unfortunately, they rarely live long enough to reach the main canopy, seldom achieve more than a few inches in diameter, and only occasionally produce fruit. Often these sprouts of American chestnuts are found alongside the dead stems of the sprouts that preceded them.

American chestnut leaves are usually what catch my eye while I am traipsing around the hills of southern Ohio. These leaves are rather large (5-9 inches long), somewhat lance shaped, and have course teeth along their edges. The large course teeth, which are hooked and point toward the tip, are the reason for the second part of its scientific name (*dentata*), which is Latin for toothed. The American Chestnut Foundation (acf.org) describes them as canoe shaped with a dull or matte upper surface. This dull appearance contrasts with the shiny surfaces of the non-native chestnut (*Castanea*) counterparts that are most often found in parks, yards, or old abandoned homesites in wooded areas.

American chestnut bur with nuts.
Photo courtesy of Dr. Sandra Anagnostakis

American chestnut foliage and twigs.
Photo courtesy of Dave Apsley

Although they are in the same taxonomic family as oaks *(Fagacea)*, they do not have the telltale, fist-like clusters of buds at the tips of the twigs like their oak cousins. Instead, the terminal buds are often absent, and lateral or side buds occur singularly. These buds are about a quarter inch long and egg shaped with only two or three visible bud scales.

The bark of large American chestnuts became deeply furrowed as they aged, but the bark of sprouts is relatively smooth and light gray. If the sprouts persist long enough, this smooth bark often begins to split. Unfortunately, this may expose them to the ever-present fungal spores of the dreaded chestnut blight (*Cryphonectria parasitica*).

The flattened nuts, for which this tree was named, are usually found in groups of two or three in a large, spiny husk. The spines on these husks are so sharp that it is somewhat painful to pick them up. Nuts are chestnut brown in color and from 1/2 to 1 inch in diameter (Virginia Tech 2021). Prior to the introduction of chestnut blight, this species was renowned for its bountiful crop of nuts that it produced on a nearly annual basis.

This species can be difficult to distinguish from its non-native relatives and hybrids that can be found in Ohio.

Dave Apsley
Ohio State University Extension

It often takes a trained eye to conclusively determine if a tree is a pure American chestnut. The American Chestnut Foundation (TACF) is interested in locating and tracking wild individuals of the species, and TACF is offering a service to identify submitted samples. For an identification guide and details on how to identify: acf.org/resources/identification/.

Thanks to the heroic efforts of The American Chestnut Foundation, researchers, cooperating agencies and organizations, and woodland owners like you, the future for American chestnut looks much brighter. Who knows? Maybe someday, in the not-so-distant future, we will be able to enjoy "chestnuts roasting on an open fire" while the wild turkey, white-tailed deer, and grey squirrels munch away on newly fallen American chestnuts in your woodland. ◆

Large American chestnut sprout at Vinton Furnace State Forest. Photo courtesy of Dave Apsley

Large standing dead American chestnut at Canter's Cave 4-H Camp. Photo courtesy of Dave Apsley

Selected References:

Apsley, D.K. (2020). Tree ID Clip: American chestnut [Video]. https://go.osu.edu/treeid.

Leopold, D.J., W.C. McComb and R.N. Muller. (1998). *Trees of the Central Hardwood Forests of North America: An identification and cultivation guide*. Timber Press. Portland, OR, pp. 148-149.

The American Chestnut Foundation. (2021). https://acf.org/.

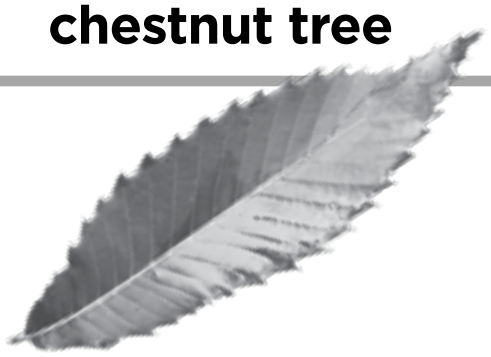
Virginia Tech Dept. of Forest Resources and Environmental Conservation. (2021). *Virginia Tech Dendrology*. https://dendro.cnre.vt.edu/dendrology/main.htm.

When Can I Buy a Blight-Resistant

Adapted from an article featured in the Ohio Society of American Forester's Hetuch Newsletter, January 2021

"When can I buy a blight-resistant American chestnut tree?" As a restoration ecologist, this is the most common question I get about chestnuts. Back when I first started in the chestnut world, my answer was "in 10-15 years." Fifteen years later, the answer is "maybe 5-10 years for members and partners of The American Chestnut Foundation (TACF) and 15-30 years for large-scale commercialization." While the timeline is being pushed out, I have never felt as hopeful about the prospect of having a blight-resistant American chestnut to plant as I do now.

Many partners working for our American chestnut tree



Let me explain. American chestnut restoration has a 100-year history of research that started at the Connecticut Agricultural Experiment Station (CAES) and United States Department of Agriculture (USDA) Office of Forest Pathology. These early programs developed hybrids that would be used in later efforts, though neither produced a blight-resistant chestnut with good timber form. CAES continued breeding for blight resistance, and in the 1980s, along with the newly formed TACF, adopted a backcross breeding method. The goal of this method was to capture the genes for resistance from the Asian chestnut parent (usually Chinese chestnut), while maintaining the American chestnut timber form through a series of six crosses. This system was the backbone of chestnut breeding for nearly 40 years.

Over time, it has become apparent that chestnut progeny produced using the backcross breeding method are not as resistant as hoped. In the words of TACF geneticist Dr. Jared Westbrook, "…there is a tradeoff between blight tolerance and the proportion of backcross trees genomes inherited from American chestnut" (Westbrook 2019). The backcross breeding program is based on capturing only two or three genes for resistance. Recent research has revealed that at least nine regions on the Chinese chestnut genome have genes related to blight. There are simply too many genes, spaced out across too many chromosomes, to capture most of them without also maintaining

American Chestnut Tree?

Leila Pinchot
Research Ecologist, USDA Forest Service
Northern Research Station, Delaware, Ohio

a predominantly Chinese chestnut genome.

But not all is lost. The backcross chestnuts are expected to have resistance that is intermediate between Chinese and American chestnuts, and the timber form is expected to be like the American parent. Whether this level of resistance is enough to restore the species across the landscape is being tested with many partners, including the U.S. Forest Service.

Creating a population of self-sustaining, disease-resistant American chestnuts will require multiple avenues of research,

Continued on page 23

Blight-resistant transgenic American chestnut developed by SUNY-College of Environmental Science and Forestry (ESF). Photo courtesy of Dr. William Powell, SUNY-ESF, 2020

Leila Pinchot by a backcross hybrid chestnut (developed by the Connecticut Agricultural Experiment Station) planted on the Allegheny National Forest, part of a study to evaluate how site quality impacts chestnut blight resistance. Photo courtesy of Margarita Rivera

American Chestnut in Ohio's

Essentially all mature American chestnut trees in Ohio were killed by the chestnut blight in the 1920s and 1930s. However, chestnut sprouts that emerge from the base of the tree (the belowground "root collar") after the top dies are resistant to the blight while they remain small. Chestnut sprouts, though uncommon, persist in the understory of woodlands in southern and eastern Ohio today.

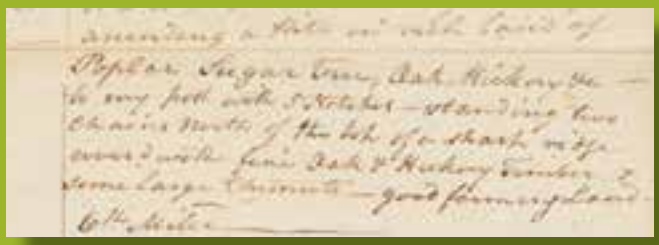
Before the blight, American chestnut was a common and sometimes abundant tree species in some areas of the eastern United States. In the Appalachian Mountains from the Smokies to southern New England, chestnut reached its greatest abundance. E. Lucy Braun named that area the Oak Chestnut Forest Region, due to dominance of chestnut with several species of oak. She noted that "On the whole, the Oak Chestnut Region is mountainous" and "its occurrence seems intimately related to slopes."

Historical records also indicate that American chestnut occurred throughout the Allegheny Plateau Region in Ohio. As we approach the more widespread reintroduction of blight-resistant American chestnut, it is important to better understand its historical abundance in Ohio, where it was found on the landscape, and the associated species.

The best source of information on Ohio's historic forests can be found in the original land surveys that divided the land into ranges, townships, and sections (counties came later). In most areas of southern and eastern Ohio, the surveys were conducted around 1800 before European settlement and land clearance began. At section corners, which were one mile apart, a post was set, and the surveyors selected and marked, or "blazed," the two nearest trees as "witness trees" to help relocate the corner. For each witness tree, the surveyors recorded the species, diameter, and the distance and direction of the tree from the corner post. Those records provide unique information on the species and size of trees in Ohio's historic forest.

The composition of the "pre-European settlement" forest in Ohio has been the focus of several publications using witness trees and other sources of information to describe the vegetation, ranging from the entire state to smaller areas of one to several counties. In 1925, Sears reported that American chestnut was found throughout the Appalachian Plateau of Ohio, from Highland and Adams counties in southwest Ohio, up to Trumbull and Ashtabula counties in far northeast Ohio (Sears). Chestnut comprised five percent of the witness trees in the Allegheny Plateau portions of Ashland, Holmes, and Wayne counties, where it was most common on ridges and slopes, growing with black oak. In Fairfield and Perry counties, oak-chestnut forests were found on ridges and upper slopes in the unglaciated area, particularly where rock outcrops were present. In a review of the "primeval forests" of Vinton and Jackson counties, oak-chestnut forests were found where the topography was most rugged, including the Zaleski State Forest area, and it was noted that "the many undecayed stumps, and young sprouts bear witness to

HISTORICAL



Ascending a hill in rich land of poplar, sugar tree, oak, hickory etc. to my post with 5 notches standing two chains north of the top of a sharp ridge covered with fine oak & hickory timber & some large chestnuts good farming land.

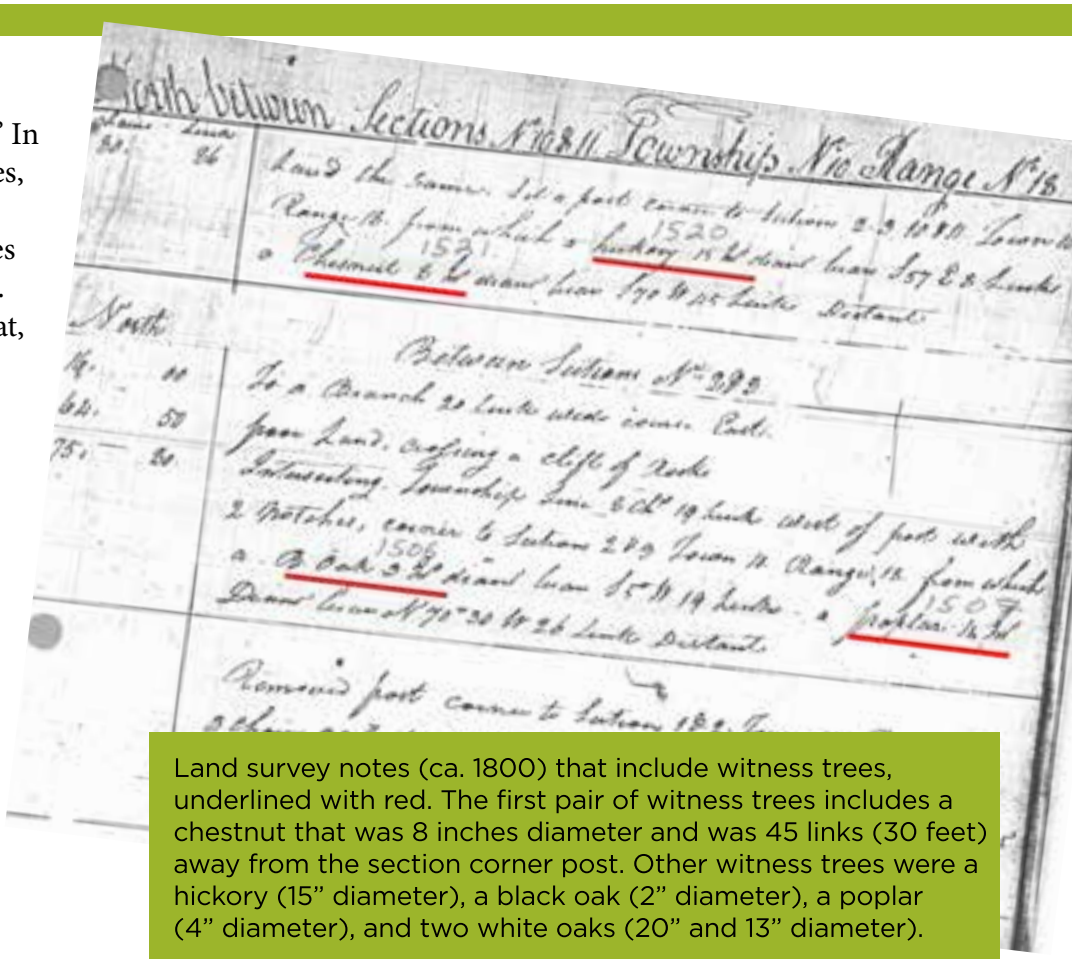
Jonathan Stone, 1795, Cheshire Township, Gallia County

Historic Woodlands

Todd Hutchinson and James Dyer
United States Department of Agriculture Forest Service

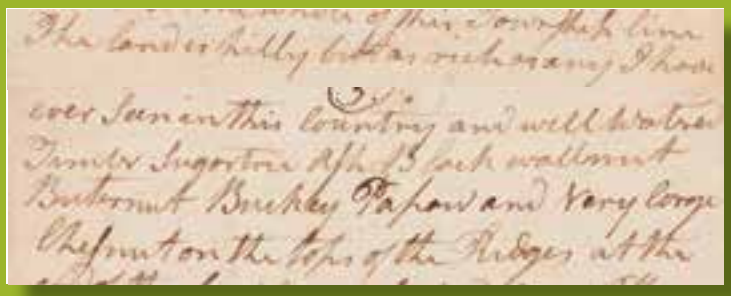
the abundance of chestnut in the past." In a portion of Adams and Scioto counties, including the current-day Shawnee State Forest, oak-chestnut communities occurred on ridges and adjacent spurs. Overall, these descriptions indicate that, in Ohio, chestnut occurred on some ridges and slopes with well-drained soils, often where sandstone rock outcrops were present – it was almost entirely absent from sites with heavy clay or limestone-derived soils. Its most common tree associates were chestnut oak and black oak, and the midstory and understory of former chestnut sites was described as often having mountain laurel, blueberries, and huckleberries, which also indicates well-drained and acidic soils.

Continued on page 24



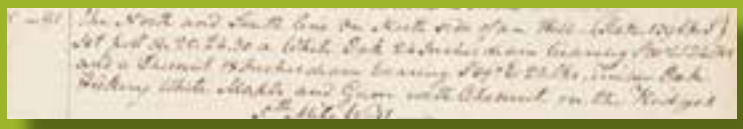
Land survey notes (ca. 1800) that include witness trees, underlined with red. The first pair of witness trees includes a chestnut that was 8 inches diameter and was 45 links (30 feet) away from the section corner post. Other witness trees were a hickory (15" diameter), a black oak (2" diameter), a poplar (4" diameter), and two white oaks (20" and 13" diameter).

SURVEYS



The land is hilly but as rich as any I have seen in this country and well watered. Timber sugartree, ash, black walnut, butternut, buckeye, pawpaw and very large chestnut on the tops of the ridges.

John Mathews, 1789, Morgan Township, Gallia County



The north and south line on north side of a hill (stake 139 links south). Set post 19.25.24.30 a white oak 24 inches diameter bearing S 30 W 24 links and a chestnut 18 inches diameter bearing S 39 E 23 links. Timber oak, hickory, white maple, and gum with chestnut on the ridges.

Jonathan Stone, 1796, Starr Township, Hocking County

The American Chestnut

The American chestnut is a species that we hold at an epic level in our minds and imagination. It is a tree, when found growing, that brings excitement to the young and old. Many people have been told by an older role model about the memories they had of this iconic tree. In the future, we will hopefully see them again in the wild because of the efforts of countless people working together.

Ohio is fortunate to have a state chapter of the national organization of The American Chestnut Foundation (TACF), started in 2006. Through the years, many partnering organizations have worked together to educate the public about the research being conducted to bring the tree back into the forest ecosystem. Much has been forgotten and relearned about the species and what it requires to grow, including soil types, slope position, and moisture tolerance.

In recent years, the Ohio Chapter has been offering grants to members to plant potential blight resistant seedlings, create demonstration plots, conduct research, and install educational signage for plantings. The grants have been responsible for multiple research projects with at least five universities, ranging from inventorying ten-year-old plantings to investigating chestnut leaf litter breakdown as related to fire. Demonstration plots are a great way for the public to see five different species of chestnuts growing in the same location. This provides the opportunity for a person to read the signs and identify the unique characteristic of each species.

During the past five years, the chapter has been focused on planting potentially blight resistant trees from the backcrossing program that was developed through more than 30 years of research by TACF. More than 6,000 seedlings have been planted at five

Stephen Rist
Athens District Manager
ODNR Division of Forestry

locations. Seedlings are planted on lands that have public access, so anyone can visit the sites. Seedlings are monitored to find optimal site conditions for future plantings. The primary threats to the seedlings are vegetative competition and deer browse. Competition with grass and natural regeneration can be treated mechanically or with herbicides. Seedlings without tree shelters have a higher chance to have the new growth browsed off. Using tree shelters or wire baskets can help but also leads to increased maintenance.

If you are interested in being involved with American chestnuts, there are multiple ways you can assist. First, National TACF is preserving the diverse genetic germplasm of wild grown chestnuts. If you know of a pure American chestnut growing naturally, National TACF would like to collect scion wood. This simply involves collecting twig cuttings in the spring and mailing them to TACF. Second, if you are interested in being involved with the transgenic chestnut project, the best plan is to plant pure American chestnuts now. When transgenic materials can be released, the first available product will be the pollen containing oxalate oxidase (OxO). Fifty percent of the pollinated seed will carry the OxO gene allowing the future seedling the opportunity to live with the fungus. Lastly, you can become involved in an organization such as TACF. The Ohio Chapter annual meeting will be in Cambridge on September 11, where there will be a board meeting, potluck lunch, updates of project progress, and a tour of a demonstration planting.

For more information, contact Stephen Rist at stephen.rist@dnr.ohio.gov or call (740) 272-8519.◆

American chestnut seedlings being planted with tree shelters at Beaver Creek State Forest. Photos by ODNR

Tree planting dibble bar used for planting an American chestnut seedling.

Outplanting of American chestnut at Scioto Trail State Forest as seen from the fire tower.

Wild Wonders in the Woods:

What are the Buteos, you ask? *Buteo* is a genus of diurnal birds of prey, specifically hawks within the family *Accipitridae*. Ohio is home to seven species of hawks. Three species — the Cooper's hawk, sharp-shinned hawk, and the rarely seen northern goshawk — belong to the genus *Accipiter*. The remaining four — the red-tailed hawk, broad-winged hawk, rough-legged hawk, and red-shouldered hawk — belong to the genus *Buteo*. As they are classified together, they share similar attributes and skills.

Buteo hawks are built for soaring and are often seen flying high above using thermals, which are columns of rising air warmed by the sun. Buteos can soar for hours with little effort. Some buteos perch in conspicuous places, such as in a dead tree, in trees on the edge of the woods, or alongside a road. My family often enjoys a game of who can count the most red-tailed hawks while on road trips. Many buteos hunt primarily small mammals but also incorporate amphibians, reptiles, and even insects into their diets. These birds are at the top of the food chain and are viewed as indicators of ecological health. They have been respected for millennia by countless cultures for their power and strength. They are truly a wild wonder in the woods.

DID YOU KNOW?

Thermals do not occur until later in the morning or early afternoon, which is why hawks are often seen soaring in the middle of the day. Hawks use thermals to soar around and around, higher and higher, before peeling off and gliding down to the next thermal. Thermals are used while hunting and during migration.

The life of an Ohio buteo

The smallest Ohio buteo is the broad-winged hawk. Roughly the size of a crow, the broad-winged hawk is often described as small and stocky. While in flight, they can be identified by their namesake, their broad wings, and by the broad white band on the tail. Adults have a brown head, back, and upperwings with variable amounts of brown to tan barring on the chest and breast.

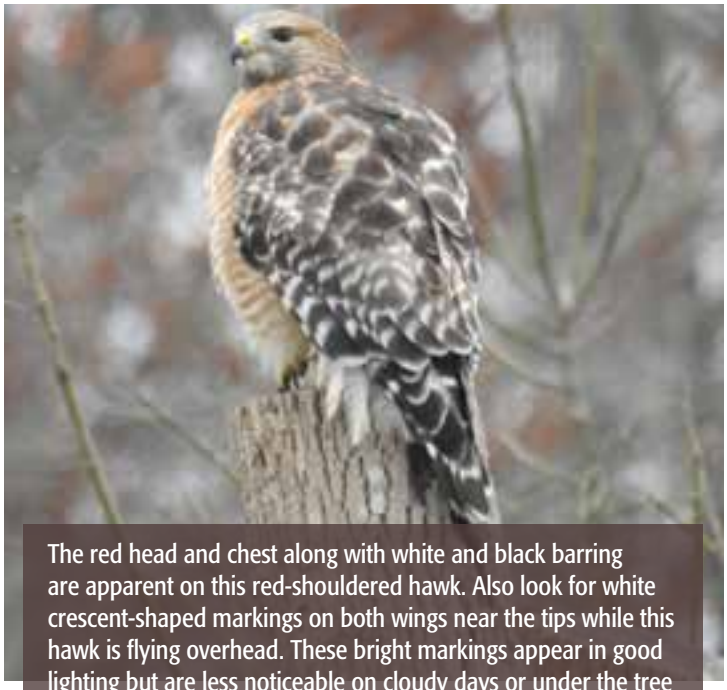
Broad-winged hawks are raptors of the woods. They prefer to breed and hunt in large, contiguous patches of mature forests with dense understories. Broad-winged hawks are migratory, overwintering in the tropics, but breeding across much of eastern North America. They can be found breeding in southern and eastern Ohio, as forest cover and maturation in those parts of the state fit their habitat needs.

The red-shouldered hawk is also a buteo of the woods.

Broad-winged hawks mostly eat small mammals, amphibians, and invertebrates including mantids, beetles, grasshoppers, worms, spiders, caterpillars, and cicadas, as seen in this picture. Photo courtesy of Brad Perkins

Marne Titchenell
Ohio State University Extension
Wildlife Program Specialist

The Buteos



The red head and chest along with white and black barring are apparent on this red-shouldered hawk. Also look for white crescent-shaped markings on both wings near the tips while this hawk is flying overhead. These bright markings appear in good lighting but are less noticeable on cloudy days or under the tree canopy. Photo courtesy of Brad Perkins

Unlike the broad-winged hawk which prefers dense forest understories, the larger, slimmer, red-shouldered hawk prefers an open subcanopy for ease of hunting. They hunt a variety of prey from small mammals and birds to reptiles, amphibians, and large insects. In some areas of their range, crayfish are an important prey item. Red-shouldered hawks hunt by soaring over open land or perching in the treetops. Often the preferred perch is a dead standing tree, an important habitat feature in any woodland where wildlife is concerned.

As the name implies, red-shouldered hawks have cinnamon to red colored shoulders. The red is also evident on the head, chest, and barring on the belly. While in flight, they can be identified by their red chest, and white and black banded flight feathers and tail. The banding in the tail is thinner than that of the broad-winged hawk.

The slightly larger, well-known red-tailed hawk can be seen in a variety of habitats from open fields to forests.

DID YOU KNOW?

Red-shouldered hawks aren't just found in the woods. They are tolerant of humans and can be found in some suburban areas with ample mature trees. Red-tailed hawks can also be found living near humans.

Note the brown belly band on this perched red-tailed hawk. Photo courtesy of Jim Lane, wildlife photographer and naturalist.

They tend to prefer more open country, with nests often located along forest edges. Adults are easily recognized by their rufous-colored tail feathers; however, juveniles must wait a few years for their namesake. In the meantime, they sport narrow light and dark bands on their tail feathers until their second summer.

Afraid you will confuse a juvenile red-tailed hawk with a red-shouldered hawk given the tail banding? The red-shouldered hawk has a red chest and belly, while the juvenile red-tailed hawk will have a white chest and

Continued on page 26

When Can I Buy a Blight-Resistant American Chestnut Tree? **continued from page 15**

many of which are already underway. Since the late 1980s, Dr. William Powell at the State University of New York College of Environmental Science and Forestry has been leading an effort to develop blight-resistant chestnut using genetic engineering. Recently, Dr. Powell's lab has developed a transgenic American chestnut that includes a single gene from the wheat plant that enables chestnut to protect itself from the blight fungus. The gene expresses oxalate oxidase, which breaks apart the toxic oxalic acid the fungus produces to kill chestnut tissue. Several studies have evaluated potential ecological impacts of the transgenic chestnut and have found no differences between transgenic, hybrid, and wild type American chestnuts.

If regulatory approval to use the transgenic chestnut for restoration is granted by USDA, Environmental Protection Agency, and Food and Drug Administration, the next step is to develop genetically diverse populations of transgenic American chestnut. This will involve outcrossing two or more transgenic chestnut founder lines to more than 600 backcross and wild type American chestnut trees over five generations. This will be an enormous effort and will only be possible with the help of citizen scientists locating wild type American chestnuts, pollinating the trees, and establishing and maintaining breeding orchards. If the thought of having to wait another 20 years or more before you can plant blight-resistant chestnut disappoints you, reach out to TACF and ask how you can help!

The findings and conclusions in this article are those of the author and should not be construed to represent any official USDA or U.S. Government determination or policy. ◆

Resources:

The American Chestnut Foundation Ohio Chapter information: https://acf.org/oh/.

TACF Chestnut Chat Series: Chestnut Science Summit. Webinars on the 3rd Friday of each month (11:30 am – 12:30 pm EST) addressing various topics related to chestnut restoration: https://acf.org/resources/chestnut-chat-series/.

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American Chestnut in Ohio's Historic Woodlands **continued from page 17**

Using witness tree data, we recently completed a study in Hocking, Vinton, Athens, and Perry counties, and the portion of Ross County east of the Scioto River, comparing today's forests with historic forests. Within that area, 5,603 witness trees were recorded at section corners, each of which we entered into a Geographic Information System (GIS) database, to place it precisely on a map. We found that only 106 of the witness trees (about 2 percent) were American chestnut, indicating that it was present but certainly not a dominant species. White oak was by far the most abundant species (34 percent) followed by hickories (14 percent), black oak (13 percent), and beech (10 percent).

We also found that chestnut was most common on upper slopes and ridges, but on slopes it was more frequently recorded on cooler (north-facing) than on warmer (south-facing) aspects. This observation was also noted by Gustav Hall in his 1957 thesis on the flora of the Vinton Furnace Experimental Forest; he described chestnut sprouts as "fairly common on rich slopes." The size of the chestnut witness trees ranged from three inches in diameter to a mammoth that was five feet in diameter. Overall, chestnuts tended to be large; the average diameter for all tree species combined was 15 inches, but chestnuts averaged 21 inches, and about one in six of the largest trees, those three feet or more in diameter, were American chestnut.

Why was chestnut less abundant in Ohio's Allegheny Plateau than in the Appalachian Mountains to the east? It is likely due mostly to bedrock geology and soils, as chestnut thrived in the more extensive acidic and well-drained soils of the mountains, where conditions were relatively moist. Though chestnut was not often a dominant tree in the original forests of Ohio, it is likely that it became more abundant as forests re-grew after the heavy logging that occurred from the mid-1800s through the early 1900s. When American chestnut was cut, it often produced abundant sprouts that grew faster than nearly all other tree species. Also, chestnut probably had an ecological impact that was greater than its abundance suggests, because it was a prolific and consistent seed producer – a mature tree could produce up to 6,000 nuts per year. Unlike the oaks, hickories, and beech that only produce bumper crops once every three to five or more years, chestnuts were reliable producers every year and the "sweet" nuts, high in carbohydrates, were an exceptional food for wildlife (and humans!). Thus, the successful reintroduction of blight-resistant American chestnuts, even as a relatively modest component of the forest, could have a positive impact on Ohio's game and non-game wildlife species. ◆

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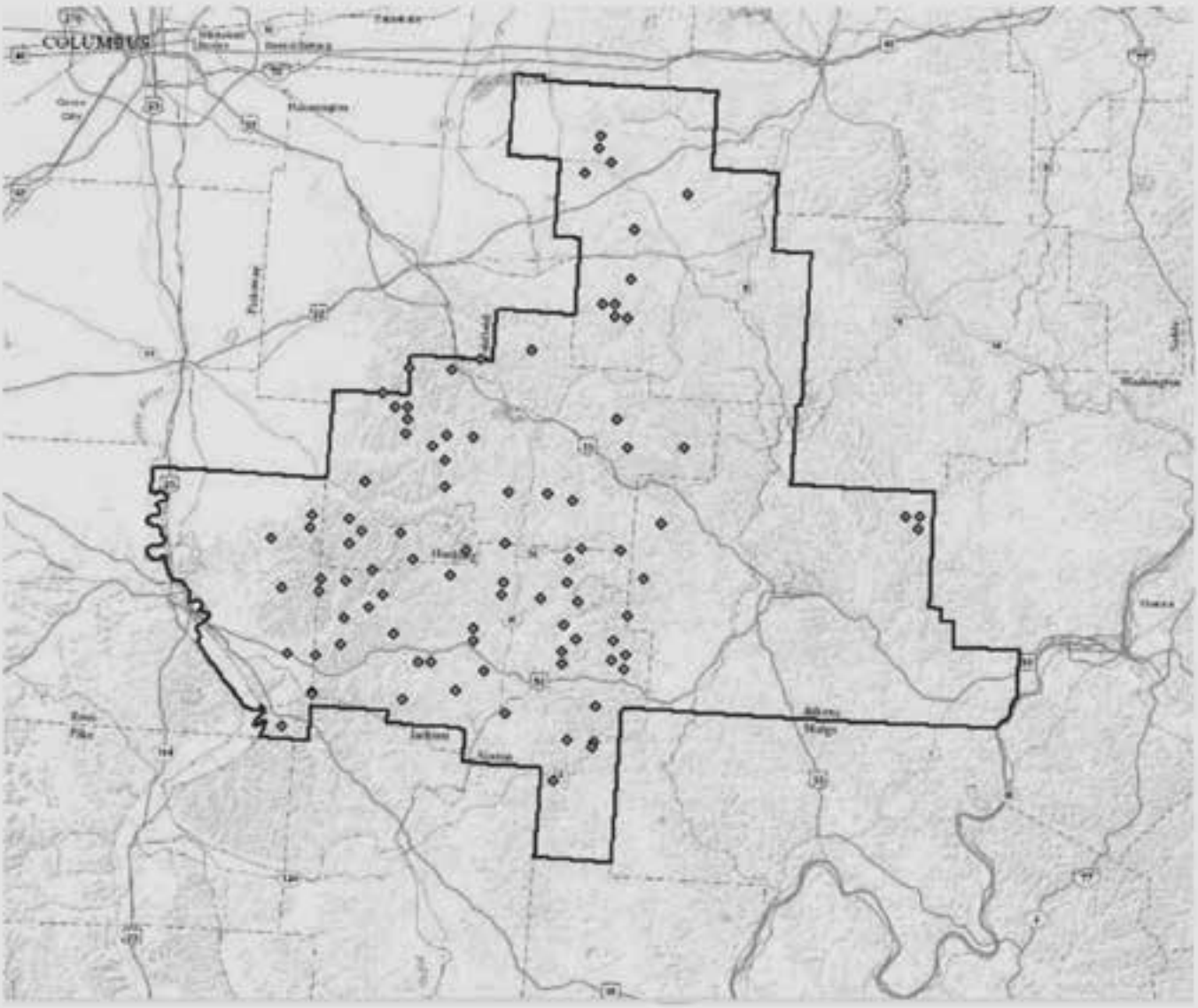


Location of 106 American chestnut witness trees in southeast Ohio.

brown band across its belly. Adult red-tailed hawks have the same distinctive white chest and brown belly band, features that help with easy identification when they are perched.

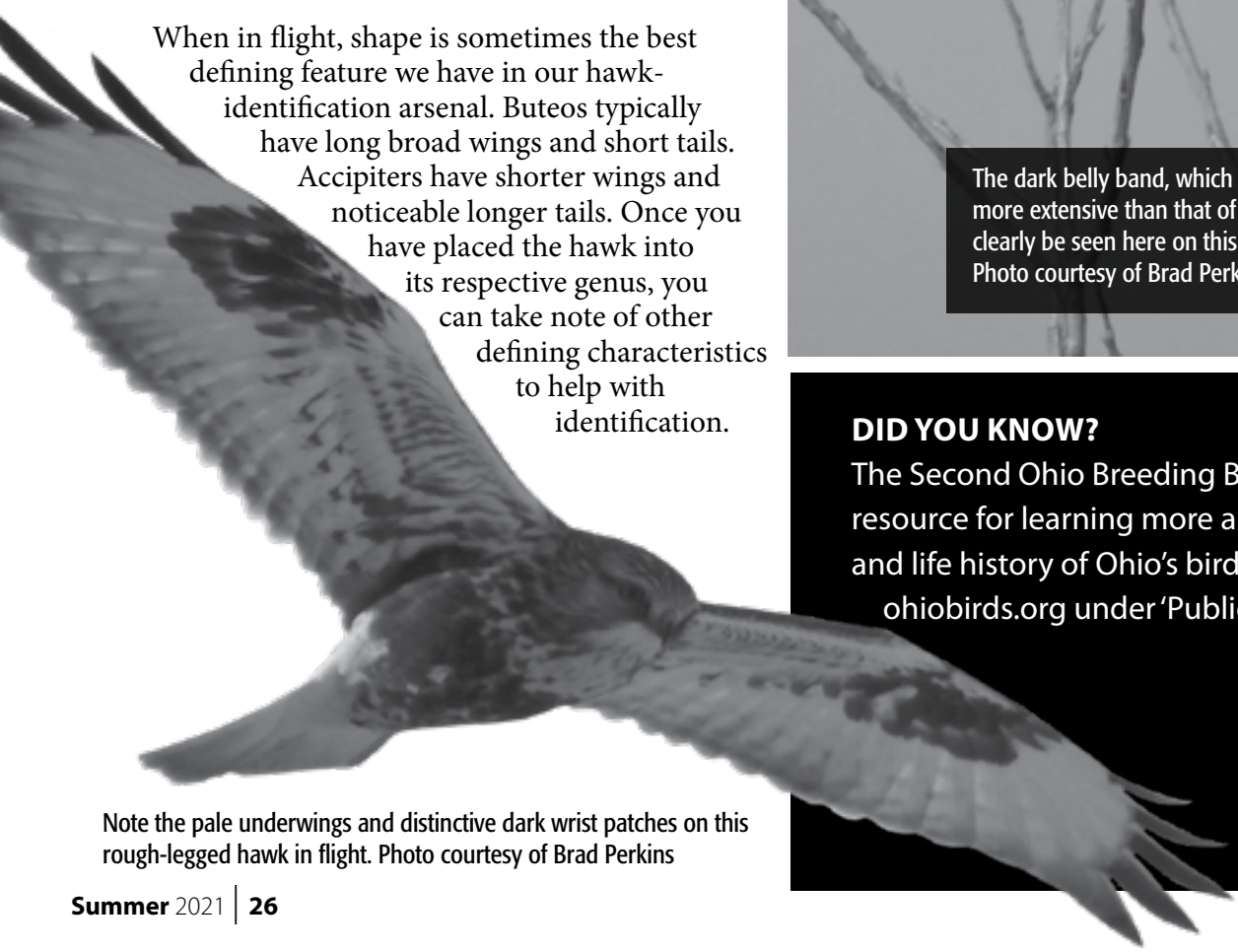
The last and largest of Ohio's buteos is the rough-legged hawk. Despite the size of this bird, which has a wingspan of 4.5 feet, it only weighs 3-4 pounds! Life in the air requires many impressive adaptations. The rough-legged hawk prefers open country and, in Ohio, is a winter resident only. They breed in open areas of the arctic, nesting on cliffs and outcroppings.

While in Ohio, they can be seen hunting over farm fields, reclaimed surface mines, and marshes. Their flight is unique among other Ohio buteos because they soar with their wings slightly raised in a V-shape. There are two color variations within this species, a dark morph and a light morph. The light morph is more common. Light morph adults have a mottled brown head, back, and chest. Female and juvenile birds have a dark belly patch. While in flight, look for black patches near the bend of the wing, which will not be seen on a red-tailed hawk. Rough-legged hawks also have white tails with a thick, dark band at the tip.

The dark belly band, which is typically darker and more extensive than that of the red-tailed hawk, can clearly be seen here on this rough-legged hawk. Photo courtesy of Brad Perkins

Signs to look and listen for

When in flight, shape is sometimes the best defining feature we have in our hawk-identification arsenal. Buteos typically have long broad wings and short tails. Accipiters have shorter wings and noticeable longer tails. Once you have placed the hawk into its respective genus, you can take note of other defining characteristics to help with identification.



Note the pale underwings and distinctive dark wrist patches on this rough-legged hawk in flight. Photo courtesy of Brad Perkins

DID YOU KNOW?

The Second Ohio Breeding Bird Atlas is a great resource for learning more about the status and life history of Ohio's birds. Check it out at ohiobirds.org under 'Publications.'

Which is Which among Ohio's Buteos?

	Rough-legged Hawk	Red-tailed Hawk	Red-shouldered Hawk	Broad-winged Hawk
Wingspan (inches)	53	49	40	34
Call	Short, loud cat-like mew	Hoarse, long scream "kee-eeee-arr"	Repetitive, loud "kee-aah"	High-pitched whistle "kee-eeee"
When will you see it?	Winter	Year-round	Year-round	Summer
Identification tips	Dark chest and belly Dark wrist patches Dark band on tail tip	White chest with brown band on belly Red tail on adult	Slim, red body Thin banding on feathers and tail	Small and stocky Broad black and white bands on tail

Wrapping it up

Hawks are quite mesmerizing, often causing us to hit the pause button on life, while we enjoy a few seconds of nature. Buteos, with their powerful builds and soaring flight, are often what comes to mind when we think of a hawk. In fact, buteo means 'hawk' in Latin. I have only scratched the surface on the many wonders of Ohio's hawks. To learn more, see the ODNR Division of Wildlife's *Raptors of Ohio* field guide at wildohio.gov. Additionally, *The Crossley ID Guide: Raptors* is an excellent resource. The guide has fully illustrated pages designed to test your identification skills. If you are looking to sharpen your raptor identification skills, I strongly recommend both. Happy birding! ◆

Silviculture 101:

Understanding the

Jim Downs
Tree Farm Owner and Inspector
Hocking College Assistant Professor

Greetings fellow woodland enthusiasts! Please allow me to introduce myself — my name is Jim Downs. I am a fellow tree farm owner, certified Tree Farm Inspector, forester, and Assistant Professor of Forest Management at Hocking College. I am a graduate of Hocking College and The Ohio State University forest management programs where I earned my master's, bachelor's, and associate's degrees. I have been practicing forestry for around 15 years. In this article, I am going to introduce what will become a series related to silviculture. I hope you will find these articles both interesting and illuminating. Personally, I consider silviculture the most interesting subject in forestry, and understanding this subject is fundamentally important to effectively managing woodlands.

What is silviculture? Silviculture is defined as the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis. There are many important details contained within this definition. So, let's dive in and take a more detailed look. The word silviculture consists of two root words, silvics and culture. In simple terms, silvics involves the relationship between trees and their environment (e.g., light, soils, moisture, nutrients), and culture deals with the process of growing trees.

While there are books filled with information about silvics, one of the most important pieces of information to understand deals with trees and their relationship with sunlight. While all trees produce their own food through

Basics of Silviculture

photosynthesis, tree species vary greatly on how efficient they are at capturing and utilizing sunlight. Importantly, we refer to some trees as shade intolerant, meaning that they do not grow well in shaded areas, and generally, these types of trees grow faster when exposed to more sunlight, for example yellow-poplar and black cherry. Other trees are referred to as shade tolerant. These trees handle shade quite well, but they do grow rapidly in full sunlight. An example of these shade tolerant trees are sugar maple and American beech. There is certainly a gradient of shade tolerances that can be observed — from eastern hemlocks that are very shade tolerant and can grow in full shade, to shade mid-tolerant white oaks that may grow best when exposed to a mixture of shade and sunlight, to shade intolerant bigtooth aspen that require nearly full sunlight to survive.

Other silvics information can certainly be very important such as a tree's ability to survive flooding when growing alongside streams and rivers or a tree's ability to handle the weight of ice and snow during winter storms. Essentially, silvics deals with how trees grow and respond to their environment and to the disturbances they face. In turn, silviculture is where foresters use their knowledge of silvics to mimic natural disturbances to manage the woods to meet multiple landowner objectives.

Within silviculture, there are four specific elements that we seek to control or manage in our forests:

(1) Establishment or age- One way forests are described is in terms of their age structure, typically even-aged or uneven-aged. In even-aged forests, the majority of trees originated following one disturbance; therefore, the trees dominating the forest are nearly "even" in age. Even-aged

My son, Joshua, exploring "his" cave on the Downs Tree Farm in Rockbridge, Ohio. Photo by author

forests are characterized by having trees that are similar in size and shape, which results in a rather uniform forest. In an uneven-aged forest, there are three or more different age classes (groups of trees where trees within a group are of similar age, but the groups themselves are different ages). As a result of this, uneven-aged forests will have a much wider range of tree sizes and shapes.

(2) Growth- In silviculture, we may attempt to increase the growth rates of individual trees, or we may focus on increasing the overall growth occurring within the forest. Either way, the emphasis is on increasing diameter growth of the trees. Surprisingly, there is very little we can do to positively affect the height growth of trees growing in our woods. The tree heights of woodland grown trees are primarily determined upon the quality of the site, with better quality sites producing taller trees. Here in Ohio, one of the most common limiting factors for the diameter growth is the amount of sunlight a tree receives. Therefore, we can have a positive influence on the growth rates of trees by providing them more sunlight. Typically, this is accomplished by removing some trees to benefit the remaining trees.

(3) Composition or species- Strategies for managing the species of trees will vary greatly depending upon the age of the forest and the targeted species. In younger woods, crop tree release can be utilized to manage for white oak by removing or deadening trees that are competing with desirable white oaks. In older woodlands, cull tree removal can be used to remove unwanted lower quality trees. In mature forests, where we will be creating a new young forest in place of the existing forest, the type of harvesting technique can influence species composition of the replacement forest. Harvesting techniques, like clearcut, shelterwood, and single-tree selection, allow different amounts of sunlight to reach the forest floor and will favor different trees species based on shade tolerances. The desired species will vary with the landowner's objectives and the site's capabilities.

(4) Health and quality- Silviculture seeks to create, maintain, and improve thriving forests. This is one of the most underappreciated tenets of silviculture. This may be based on misconceptions regarding timber harvesting and a limited understanding of how forests adapt and change.

Clearly defined management objectives are important when deciding which silvicultural practices will help you meet your goals for your woods. In future articles, I will discuss a variety of those practices in detail. Until then, if you are looking for more information, talk with a forester and inquire about having a management plan written for your woods. It is my hope that this article laid the foundation for the basics of silviculture and laid the path for our continued discussion of this important topic in the future. **If you have any questions related to silviculture, please reach out to me by email at downsj3891@hocking.edu.** ◆

REGIONAL WOODLAND INTEREST GROUPS UPDATE

So much to learn – from each other and natural resource experts!

East Central Ohio Forestry Asociation

We had a wonderful Zoom meeting in June with Adam Regula speaking about spotted lanternfly. Very informative. We all enjoyed it.

Levi Arnold, District Administrator/Wildlife/Forestry Specialist with Guernsey Soil and Water Conservation District will be our August presenter. Levi has yet to decide which of his many subjects he will be sharing with us that evening, but he is always interesting.

We are working with the Norma Johnson Center for our September meeting. We are hoping to have someone come talk with us about wildflowers and butterflies.

ECOFA meets the first Wednesday of each month. We usually meet at the Dover Library at 7:00 p.m. For the next several months we are attempting to meet outdoors.

Contact us on Facebook or call Kathy Myers at (330) 418-4875.

Northeastern Ohio Forestry Association

Like the other woodland interest groups, NEOFA had to cancel this year's annual banquet and suspend all in-person meetings. This will soon change with the lifting of the state's COVID-19 restrictions. NEOFA plans to resume the regular monthly meetings on Thursday, September 16th, at 7:00 p.m.

We will have Bryan Weyant from the Columbiana County Soil and Water Conservation District speak about the spotted lanternfly.

We will be changing our meeting location to a new venue and will no longer be meeting at Mill Creek Metro Park. The new meeting location will be the Ohio State University Extension office, just over a quarter mile north of Mill Creek Metro Park. The new meeting address is 490 S. Broad St., Canfield, Ohio 44406.

Northwest Ohio Woodland Association

The NWOWA normally meets four times a year, but meetings were cancelled due to the coronavirus.

We are going to start again with live meetings. This last meeting of the year is tentatively scheduled for Saturday, September 4, from 9:30 am to noon. We realize this is Labor Day weekend, but we hope you can join us. The meeting will be held at the Tom Deeds farm at 12555 Twp. Rd. 59, Rawson, OH 45881 where we will see his sawmill operation as he cuts up some logs. He will also demonstrate his log arch and his new 20" planer. Tom will also show us a restoration planting on his farm. There is also the possibility of a trip to his neighbor, Jim Spurgat, to see how his farm, which is involved in a conservancy program, has changed since we last saw it several years ago. Lunch will be provided. Please bring a covered dish. The meal will be served, and masks are optional.

This last meeting of the year will involve 2022 program planning along with the program. So, come with all your program ideas.

For more details on the Northwest Ohio Woodland Association and future meetings, contact Tom Mills at (419) 721-1465.

Ohio Walnut Council
Cassie Ridenour

The Ohio Walnut Council held a field day on June 5th at Duckworth Farms in Fayette County. You may remember the Duckworths – they were our Tree Farm of the Year in 2016. It was a big day and included donuts, lunch, and tours of the Duckworth property. The Duckworths are the 6th and 7th generation on the property, and Chris, his wife Bonnie, and their son Samuel are the 3rd and 4th generation to manage the forests. Their walnut plantations were planted in 1935 and 1985, and growth is being monitored. Several stories were told about Chris' grandfather B.R. Duckworth. He planted the trees and was an avid naturalist, fruit and tree propagator, and character. One story, about how he used bags of human hair as a deer deterrent, hit home with me, and I have since started emptying the dog and cat hair from my Shark vacuum around the perimeter of my raised beds. So far, so good.

The tour drew a good crowd, including folks from Indiana. It was great to be out on the ground with experts again. During the tour we did some measurements on trees and found that the ones we measured were growing about ¼ inch in diameter per year, which was attributed to the soil composition.

There were several foresters on hand, and the markets for walnut and walnut veneer were discussed. Forester Eugene Walters sells walnut to the export market, and he reported that walnut demand has rebounded. Walnut is very popular in China, where its dark color is interpreted as a sign of strength. It was also mentioned that export laws to Europe have changed and that raw unprocessed logs can no longer be sold to the European Union countries.

The Ohio Walnut Council meets twice annually. They plan to meet again in October, at a date yet to be determined. For more information, keep an eye on our Ohio Tree Farmers Facebook Page or contact Bill Hammitt at hammittw@clemson.edu.

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The editorial board of ***The Ohio Woodland Journal*** is looking for businesses or individuals who are willing to sponsor annual subscriptions of the ***Journal*** for all of their county public and private high school libraries. Partial sponsorships are certainly welcomed from those who reside in urban counties with numerous school districts.

Individual subscription rates are $15.00 per year for four issues. Each high school principal will receive a letter prior to their first issue of ***The Ohio Woodland Journal*** announcing that you or your business is generously supporting the county's schools by supplying four free issues to their library. You will also be listed in the ***Journal*** as a sponsor.

If you would like to assist in placing the ***Journal*** in your county schools or need additional information, please contact: Gayla Fleming, Ohio Tree Farm Committee, 507 Main St., Suite 200, Zanesville, Ohio 43701 • (888) 388-7337 • Gayla@OhioForest.org

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