



TREES OF OHIO field guide

DIVISION OF WILDLIFE



INTRODUCTION

Forests in Ohio are diverse, with 99 different tree species documented. This field guide covers 69 of the species you are most likely to encounter across the state. We hope that this guide will help you appreciate this incredible part of Ohio's natural resources.

Trees are a magnificent living resource. They provide shade, beauty, clean air and water, good soil, as well as shelter and food for wildlife. They also provide us with products we use every day, from firewood, lumber, and paper, to food items such as walnuts and maple syrup. The forest products industry generates \$26.3 billion in economic activity in Ohio; however, trees contribute to much more than our economic well-being.

The more we learn about trees, the more we can understand, protect, and enjoy them.

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HOW TO USE THIS BOOKLET

Family name Common name Scientific name

Overview

Known for its spreading canopy and distinctive smooth bark, American beech is a slow-growing tree found throughout the state. It is an excellent wildlife tree. High nuts are high in protein and fat and eaten by many birds and mammals. Furthermore, many beech tree trunks are partially hollow and provide excellent den sites for various wildlife, including squirrels, raccoons, and opossums. This native tree can adapt to soils of variable pH and composition but prefers rich, well-drained soils with consistent moisture. While American beech is shade tolerant, it achieves best growth in partial to full sunlight. It is usually long lived and free of problems, but can be susceptible to beech bark disease, beech leaf disease, and storm damage.

LEAF: Alternate and simple with coarse serrations on their slightly undulating margins, 2-4 inches long. Fall color from yellow-green to a rich golden-brown; older trees hold dead leaves throughout winter on lower, exterior branches while young trees hold virtually all of their dead leaves until spring (making them stand out in the woods in the winter).

FRUIT OR SEED: Fruits are composed of an outer prickly husk that splits open in late summer and early autumn to reveal one or two triangular, edible nuts encased by both and mammally able. Beech nuts are known as an excellent food source for wildlife, high in fat and protein and produced in large quantities.

TWIGS AND BUDS: Buds are long (½ to 1 inch), narrow, pointed, occurring on under twigs.

SHAPE: Smooth, thin, light to steel gray, that is commonly carved with initials and graffiti and holds carvings for decades. Carvings create wounds for disease entry, so please respect the tree!

MATURE HEIGHT: 60-80 feet.

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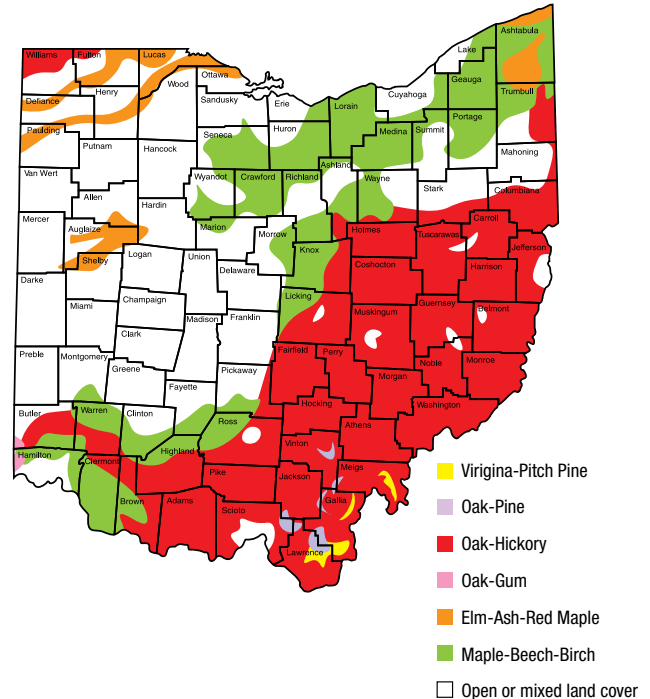
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THE HISTORY OF OHIO'S FORESTS

Prior to European settlement when Ohio's forests covered 95 percent of the state, it was said that a squirrel could travel from one corner of the state to the other without touching the ground. While that may be an exaggeration, forests of many types were abundant throughout the state. Elm-ash forests were dominant in the northwest Ohio swamp lands and streamside areas; mixed oak-hickory forests dominated the southeast Ohio hill country, and maple-beech forests were common in northeast Ohio and much of Ohio's current farm country. With the historical clearing of forestland followed by natural conversion of old fields back to woods, oak-hickory forests likely expanded their distribution. Currently oak-hickory forests are the most common forest type in the state at around 63 percent of all forests. A broader northern hardwood forest type that includes maple and beech is next in abundance, covering around 20 percent of Ohio's forestland. Elm-ash forests are still common in northwest Ohio and along streamside areas. However, with the introduction of the exotic beetle called the emerald ash borer into Ohio in 2003, most of Ohio's mature ash trees are dead or dying. The total area of forest land in the state has stabilized in the past two decades at around 30 percent of the total land area. The majority of forests are in the mid-successional stage and are dominated by trees that are often over a foot in diameter and 50 to 90 years old.

Significant clearing of forests occurred until the 1940s when only 12 percent of the land remained forested. Forest land has expanded to current conditions, where 31 percent of Ohio's land area is covered by forests.



WHY ARE TREES IMPORTANT FOR WILDLIFE?

SUCCESSIONAL FORESTS

Many wildlife species are reliant on forests to provide the basic habitat requirements of food, water, shelter, and space. Different species of wildlife require diverse habitat components and are dependent on various stages of forest succession, or ages, to meet their specific needs. Forests grow as plants develop and age towards maturity, and each state of succession offers different habitat assets. The early stages of a forest's life are just as important as the later stages, and provide much needed diversity in habitat.

Many people believe that older forests provide enhanced habitat opportunities for wildlife, and that the highest diversity of species would be found in these areas. While it's true that mature forests are home to many species, a variety of forest age-classes will do more to attract a wider diversity of wildlife.

Early successional, or young, forests produce an abundance of fruits and seeds, and provide shrub thickets for cover which attracts species such as common yellowthroats, eastern towhees, and bobcats. Mid-successional, or mid-aged, forests support species that use a wide range of habitats such as wild turkeys, indigo buntings, and white-tailed deer. Mature, or older, forests produce more acorns and nuts and provide snags and tree cavities for nesting which attracts species such as flying squirrels, pileated woodpeckers, and silver-haired bats. Even open areas with little woody vegetation produce seeds and insects for wildlife and provide herbaceous food and cover which attracts species such as eastern cottontail rabbits, field sparrows, and prairie warblers.

THE IMPORTANCE OF MAST

Mast is a term used to describe the fruit of a woody plant. The fruit is the part of the tree that contain the seeds and protects them until they can sprout in the ground. These fruits are categorized as either hard mast or soft mast.

Hard mast are seeds with a hard outer covering, such as acorns, hickory nuts, and walnuts. Hard mast is an important food source for wildlife because it does not decay quickly, thus providing animals with nutrition throughout the winter. It is a good source of protein and fat which are important nutritional components. Trees require a large amount of energy to create hard mast, so they generally only produce a substantial crop every few years. Many wildlife species consume acorns, including some you might not think of, such as foxes and ducks. Oak-hickory forest is the most widespread forest type in Ohio and is an important habitat in the eastern U.S. However, poor oak regeneration in recent years is a cause for concern.

Tree species such as maple, poplar, and beech are increasing in abundance. These species grow faster than oaks and do not require as much sunlight, shading out smaller trees. Maples and poplars produce a fruit that is classified as soft mast, meaning it has a soft outer covering and decays quickly. It is usually high in sugar and carbohydrates which are not as important nutritionally. This makes it an unreliable food source during the winter, but it does serve as a good short-term energy source for migrating wildlife that pass through Ohio. Trees don't use as much energy to produce soft mast, so it is more readily abundant every year.



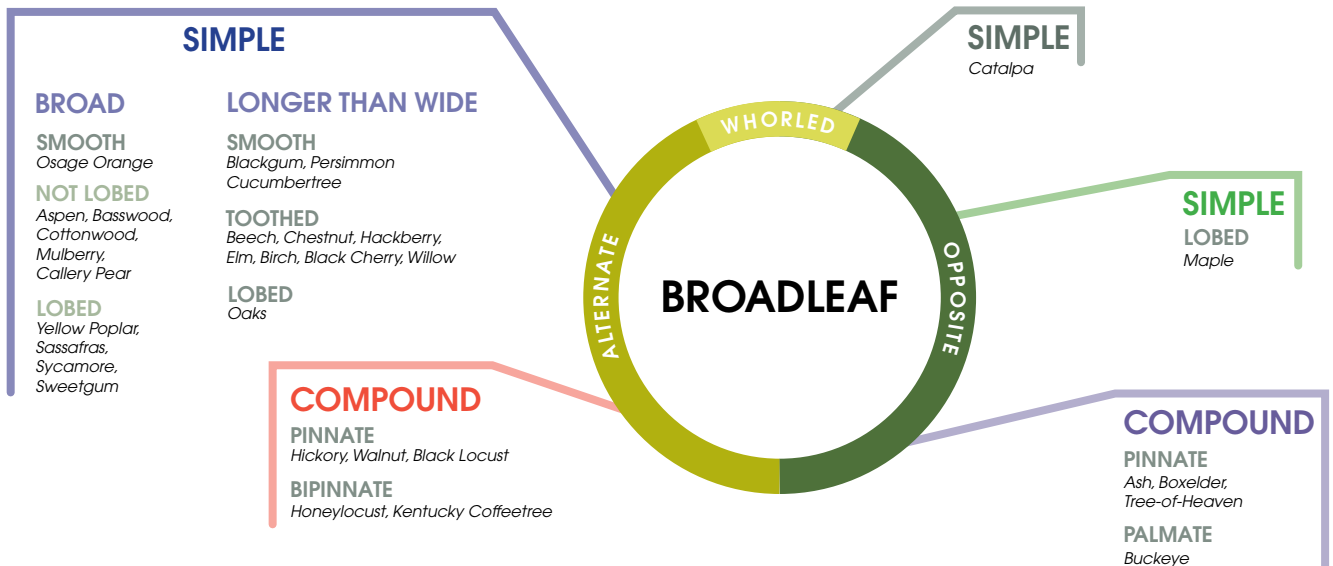
SQUIRREL
BY NINA HARMANN

BROADLEAF TYPES

One of the most important tree identification concepts is leaf and branch arrangement. All of Ohio's trees can be placed into one of three categories: alternate, opposite, or whorled. In an alternate leaf and branch arrangement, there is one leaf or branch per plant node, and they alternate sides. In an opposite leaf and branch

arrangement, two leaves or branches arise from the same node on opposite sides of the stem. Most Ohio tree species have alternate arrangement. To remember the few tree species that have opposite arrangement, use the mnemonic of MAD BUCK (maple, ash, dogwood, and buckeye). Another important concept is differenti-

ating between simple and compound leaves. Simple leaves have a single leaf blade, while compound leaves consist of multiple leaflets. Once you have determined if a tree has alternate, opposite, or whorled leaf and branch arrangement, you can use the broadleaf diagram on the following page to further identify leaves.



LEAVES & LIMBS

SHAPES



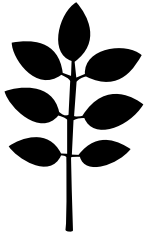
Lobed

deeply indented margins



Palmate

resembles a hand



Odd Pinnate

leaflets in rows, one at tip



Bipinnate

leaflets also pinnate

MARGINS



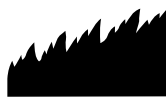
Entire

even, smooth
throughout



Spiny

teeth sharp
stiff points



Doubly Serrate

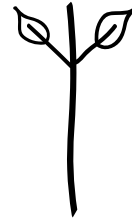
serrate with sub-teeth



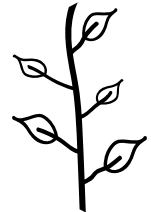
Serrate

teeth forward-pointing

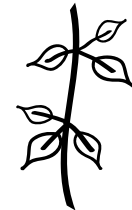
ARRANGEMENT



Opposite



Alternate



Whorled

AMERICAN BEECH

Fagus grandifolia



Known for its spreading canopy and distinctive smooth bark, American beech is a slow-growing tree found throughout the state. It is an excellent wildlife tree. Beech nuts are high in protein and fat and eaten by many birds and mammals. Furthermore, many beech tree trunks are partially hollow and provide excellent den sites for various wildlife, including squirrels, raccoons, and opossums. This native tree can adapt to soils of variable pH and composition but prefers rich, well-drained soils with constant moisture. While American beech is shade tolerant, it achieves best growth in partial to full sunlight. It is usually long-lived and free of problems, but can be susceptible to beech bark disease, beech leaf disease, and storm damage.

LEAF: Alternate and simple with coarse serrations on their slightly undulating margins, 2-4 inches long. Fall color from yellow-green to a rich golden-brown; older trees hold dead leaves throughout winter on lower, interior branches while young trees hold virtually all of their dead leaves until spring (making them stand out in the woods in the winter).

TWIGS AND BUDS: Buds are long ($\frac{3}{4}$ to 1 inch), narrow, pointed, occurring on outer twigs.

FRUIT OR SEED: Fruits are composed of an outer prickly husk that splits open in late summer and early autumn to reveal one or two triangular, edible nuts enjoyed by birds and mammals alike. Beech nuts are known as an excellent food source for wildlife, high in fat and protein and produced in large quantities.

BARK: Smooth, thin, light to steel gray, that is commonly carved with initials and graffiti and holds carvings for decades. Carvings create wounds for disease entry, so please respect the tree!

SHAPE: Short trunk, rounded to spreading.

MATURE HEIGHT: 60-80 feet.

AMERICAN CHESTNUT

Castanea dentata



Formerly a common mature forest tree across eastern Ohio, American chestnut was devastated by the chestnut blight disease. Most American chestnuts found in the wild today are sprouts from old chestnut trees that died back from the blight and sprouted from the stumps, a cycle that has been repeated multiple times over the years. Breeding programs have introduced blight-resistance genes from Asian chestnuts into resistant strains of American chestnut with some success, but its uncertain when large-scale reintroduction into forests will become an option. Historically, it preferred moist, deep, acidic soils in full sun. Its nuts were once a staple food of the Native Americans, pioneers, and a diversity of wildlife. It has rot-resistant wood that was

harvested to produce a variety of products from furniture to construction lumber.

LEAF: Alternate, smooth surface, simple, 5-9 inches long, elliptical to oblong in shape, with sharp-pointed tips and sharply pointed teeth on margins. Fall color is yellow, gold, or brown.

TWIGS AND BUDS: Stout, hairless, orange brown in color. Buds are orange-brown and measure up to ¼ inch long. Terminal buds are singular, not clustered like oaks.

FRUIT OR SEED: Large, round, prickly husks containing several shiny chestnut-brown nuts that are flattened on one or two sides. Husks split open in autumn and exposed nuts are eaten by wildlife.

BARK: Young bark is smooth, shiny, and olive-brown with prominent lenticels. Mature bark is dark gray-brown and thick with shallow irregular furrows separating broad flat-topped shiny ridges.

SHAPE: Once a tall and excellent formed tree, American chestnut is now found mostly as small stump sprouts.

MATURE HEIGHT: 80 feet (historically, prior to blight).

DECIDUOUS

FAMILY BEECH

BLACK OAK

Quercus velutina



The native black oak is present throughout almost all of Ohio but is most frequently found in Appalachian foothills and sandy ridges near Lake Erie. This deeply taprooted oak prefers full to partial sun and moist, deep, well-drained acidic soils but can also excel in poor, dry soil sites. Commonly confused with northern red oak, these trees are basically problem-free other than minor cosmetic damages from insect feeding.

LEAF: Dark green, alternate, 4-9 inches long, and moderately shiny, broadly obovate, with five to nine lobes that have bristles terminating each tooth on the forward-pointing lobes. Underside of leaves are commonly hairy. Sinus depth is variable, with some leaves displaying shallow sinuses and others with deep sinuses. Fall color ranges from yellow to brick red.

TWIGS AND BUDS: Twigs terminate in a cluster of light-colored pubescent buds on reddish-brown smooth to pubescent twigs.

FLOWER: Monoecious, small golden catkins.

FRUIT OR SEED: Acorns, about $\frac{3}{4}$ inch long, are oval or rounded, slow to mature, and enclosed for about half of its length in a deep, loosely scaled, bowl-shaped cup.

BARK: Mature bark of black oak is dark gray to near black and divided into broad, furrowed ridges. The inner bark is bright orange or yellow.

SHAPE: Taller or more dwarfed depending on location, crown is usually rounded.

MATURE HEIGHT: 50-80 feet.

BUR OAK

Quercus macrocarpa



The bur oak is a massive, slow-growing tree found throughout Ohio except for some southeastern counties. It is adaptable to both moist and dry sites and often found standing by itself. The bur oak is one of the most picturesque of the oaks. Its fiddle-shaped leathery leaves, huge-fringed acorns, thick and sometimes corky twigs, and deeply ridged, fire-resistant bark add to its bold texture.

LEAF: Textured, leathery leaves that are 4-12 inches long and 3-6 inches wide, alternate, teardrop shaped, and usually dark green. Leaf shape varies significantly but consists of about five to nine lobes of different sizes. Lower lobes are small, the central lobes average, and

the upper lobes are large with crenate margins. Center pair of sinuses extend nearly to the mid-rib. Fall color is usually yellow to yellow-brown, but leaf drop is usually complete.

TWIGS AND BUDS: Branchlets are sometimes corky, while at other times moderately rough, but non-corky. Clustered terminal buds are blunt and often large, occurring on its stout twigs.

FRUIT OR SEED: Large acorns are oval or broadly ovate, broad at the base, and rounded at the depressed apex. The acorn is up to 1½ inches long and nearly covered by a rough, frilled cap.

BARK: Mature bark becomes highly ridged and deeply furrowed with dark gray color that is characteristic of the white oak group.

SHAPE: Pyramidal to oval.

MATURE HEIGHT: 70-90 feet.

CHESTNUT OAK

Quercus montana



This oak is found in eastern and southern Ohio, in the unglaciated Appalachian highlands. The slow-growing chestnut oak is named due to its resemblance to the American chestnut tree. Because this species is a source of tannin extract (an organic substance used in leather production), this tree is also known as the tan-bark oak. This native tree grows best in full to partial sun and moist, well drained, acidic soils; however, is highly adaptable and can often be found growing in poor, rocky, dry soils of alkaline or neutral pH.

LEAF: Dark green and leathery, 4-8 inches long, alternate and obovate. They are roughly oval but often wider near the apex with large, rounded teeth. Leaf undersides are medium-green and often hairy.

TWIGS AND BUDS: Stout twigs with rapidly accumulating bark; large, jagged, and pointed terminal buds that are clustered.

FRUIT OR SEED: Acorn is shiny, large, oval-shaped, and takes only one season to develop. The cup is thin, covered with fused scales, and attached to branches by long peduncles.

BARK: Its unique light to medium gray mature bark features triangular ridges with deep furrows in between them.

SHAPE: Variable, can be pyramidal to oval to rounded.

MATURE HEIGHT: 70-100 feet.

CHINKAPIN OAK

Quercus muehlenbergii



This native oak is most common in the limestone soils of southwest Ohio, but scattered in other areas except in the northeastern corner of the state. Also known as sweet oak or chinquapin oak, its small acorns draw a variety of wildlife including wild turkeys, deer, chipmunks, and squirrels. Historically, its durable wood was used for split-rail fences and railroad ties. Chinkapin oak adapts to many soil conditions but prefers moist, well-drained, deep, rich, alkaline soils and full to partial sun.

LEAF: Glossy alternate, oblong to slightly obovate, 4-6 inches long with margins that may be deeply or shallowly crenate. Fall color is usually yellow to yellow-brown; leaf drop is usually complete in late autumn.

TWIGS AND BUDS: Small, clustered terminal buds are orange-brown and sharp pointed on slender twigs.

FRUIT OR SEED: Acorns are small, up to $\frac{3}{4}$ inch in size, and mature in one season, with a thin, bowl-shaped warty cap covering half the nut and a smooth inner lining that looks like a shiny bowl. Acorns are known as the sweetest of Ohio's oaks.

BARK: Immature bark is light gray and ranges from flaky to platy. Mature bark has ridges that break into light gray blocks and are separated from dark gray deep furrows. Bark flakes off easily when rubbed.

SHAPE: Spreading.

MATURE HEIGHT: 60-80 feet.

NORTHERN RED OAK

Quercus rubra



Northern red oak is important to the Ohio timber industry, providing strong hardwood used in the production of beams, railroad ties, furniture, flooring, and more. A popular shade and ornamental tree, northern red oak is noted for its distinct red-brick autumn foliage and rapid growth rate. Northern red oak acorns mature earlier in the season than most oaks and are enjoyed by many forms of wildlife as a result. Northern red oak prefers moist, deep, rich, well-drained soils of slightly acidic pH and full to partial sun. Other than cosmetic blemishes from insect feeding, this native oak is basically problem-free.

LEAF: Broadly teardrop shaped with seven to 11 bristle-tipped lobes, 4-9 inches long, up to 6 inches wide with smooth surface, dull green above but paler with small tufts of reddish-brown hair in vein-axils beneath. Sinus depths vary between trees from shallow to nearly mid-rib.

TWIGS AND BUDS: Terminal buds are clustered. Twigs are greenish or reddish brown, smooth when mature. Buds are pointed, light brown, and smooth.

FRUIT OR SEED: Acorns are $\frac{3}{4}$ to $1\frac{1}{4}$ inches long; the cup shallow, saucer shaped, covering $\frac{1}{4}$ of the nut. Scales reddish-brown, narrow, tight, and sometimes fuzzy on the edges. The acorns develop over two growing seasons, ripening in early summer and late autumn.

BARK: Immature bark is smooth and light gray, maturing to dark gray or nearly black with shiny flattened ridges resembling ski tracks.

SHAPE: Rounded.

MATURE HEIGHT: 70-100 feet.

DECIDUOUS

FAMILY BEECH

PIN OAK

Quercus palustris



Often seen in moist lowlands and wetlands, the pin oak is known for its strong wood, dense shade, and distinctive branching. Pin oak has persistent dead branches with the lower branches angled down. Generally, this native tree requires moist and acidic soils with full to partial sun for optimum growth. Pin oak suffers from leaf chlorosis if transplanted in neutral or alkaline soils. Pin oaks can also suffer from insect galls and other pathogens that afflict oaks.

LEAF: Glossy, dark green leaves that are 3-6 inches long with five lobes separated by very deep sinuses.

TWIGS AND BUDS: Terminal buds are small and in clusters on reddish brown twigs.

FRUIT OR SEED: Acorns that are nearly round and $\frac{1}{2}$ inch long with a thin, saucer-shaped cup made of small, tight scales. Acorns are eaten by songbirds, deer, wild turkeys, squirrels, rodents, and ducks.

BARK: Thin, slightly ridged and shallowly furrowed when young; dark gray to gray-brown in maturity.

SHAPE: Somewhat conical with the lower branches angled downward.

MATURE HEIGHT: 70-100 feet.

SCARLET OAK

Quercus coccinea



Named for its brilliant fall colors, scarlet oak is found abundantly on dry sites in eastern and southern counties but is rare elsewhere. This fast-growing native tree prefers dry, acidic soils and full to medium sun; it will not perform well in soils of neutral or high pH and may develop chlorosis (yellowing of leaf blades). Scarlet oak acorns are an important food source for many songbirds, wild turkeys, squirrels, and deer.

LEAF: Alternate, broadly elliptical, 4-7 inches long to 5 inches wide, with toothed and pointed lobes. Sinuses vary in depth and width, even on the same tree. Deep sinuses cutting nearly to mid-rib with narrow, bristle-tipped lobes are common in the upper part of the tree canopy.

TWIGS AND BUDS: Twigs terminate in a cluster of buds with varying size and degree of pubescence, ranging from small on grayish-green twigs to large and hairy on reddish-brown twigs.

FRUIT OR SEED: Acorns are $\frac{1}{2}$ to 1 inch long, oval, and enclosed to about $\frac{1}{2}$ of their length in a deep, bowl-like cup. They often have concentric rings resembling a bull's-eye on the exposed acorn tips.

BARK: Thin bark becomes moderately ridged and shallowly furrowed with age and is dark gray to gray brown in color.

SHAPE: Pyramidal to rounded.

MATURE HEIGHT: 60-90 feet.

SHINGLE OAK

Quercus imbricaria



The narrowly split wood of this native tree was historically used by pioneers to make shingles, resulting in its common name. Shingle oak is scattered throughout the state, found in a variety of environments, and adapts to a variety of sites. Its canopy is often broad-spreading at maturity, and it is the only oak native to Ohio that has simple, non-lobed leaves with entire margins. Shingle oaks prefer moist, well-drained, acidic soils and full to partial sun, but adapts well to relatively poor, dry soils of neutral or slightly alkaline pH. These trees will get a slight amount of leaf chlorosis in very high pH soils and are subject to the usual array of pests and pathogens that can affect many oaks, including borers, galls, gypsy moth, and leaf scorch.

LEAF: Unlike most oaks, leaves are unlobed, 4 to 6 inches long, alternate, simple, shiny and leathery, elliptical to oblong, terminated by a single bristle tip. Fall color is usually yellow to reddish-brown and many leaves may persist in the interior canopy throughout the winter.

TWIGS AND BUDS: Twigs terminate in a cluster of egg-shaped buds covered with closely overlapping light brown scales. Twigs often have noticeable woody galls.

FRUIT OR SEED: Acorns take two years to mature. They are rounded, about ½ inch long, and topped with a thin, reddish-brown cap enclosing the top of the nut.

BARK: Thin immature bark becomes ridged and furrowed with age; dark gray to gray brown in color. Wood is distinctly red-orange when cut or split.

SHAPE: Broad-spreading.

MATURE HEIGHT: 60-80 feet.

SHUMARD OAK

Quercus shumardii



Shumard oak occurs sporadically in the western half of Ohio, often growing in ravines, upper floodplains, and along streams. Its small acorns are consumed by wildlife such as squirrels and deer. Shumard oak is an excellent urban shade tree due to its adaptability, rapid growth, and tolerance of air pollution and compacted soil. This native tree prefers moist, well-drained deep soils of variable pH and full to partial sun but can tolerate very dry and alkaline soils. Other than minor cosmetic blemishes on foliage due to insect feeding, Shumard oak is basically problem-free.

LEAF: Alternate, simple, 4-7 inches long, broadly ovate, and shiny with seven to nine lobes with coarse bristle tips and sinuses that are normally deep. Fall color ranges from russet to orange-red in good years.

TWIGS AND BUDS: Olive-green, stout twigs terminate in a cluster of light-colored, smooth, or slightly fuzzy buds.

FLOWER: Both male and female flowers are found on this tree in mid-spring, giving it the ability to self-fertilize. Fertilized flowers take two years to develop into mature acorns.

FRUIT OR SEED: Acorns are single or paired, $\frac{3}{4}$ to 1 $\frac{1}{4}$ inches long, oblong and ovoid. The top of the acorn is covered with a shallow, bowl-shaped, scaly cap.

BARK: Immature bark is light gray, smooth, and reflective in winter sun. Mature bark is ridged, furrowed, and dark gray in color.

SHAPE: Pyramidal and spreading.

MATURE HEIGHT: 60-90 feet.

SWAMP WHITE OAK

Quercus bicolor



The swamp white oak can be found throughout most of the state, though not abundant in southeastern Appalachian counties. As its name would suggest, swamp white oak can frequently be found growing in swamps, wetlands, and near bodies of water although it is very drought tolerant. It prefers rich, moist to wet, poorly drained acidic soils and full to partial sun. Its wood is indistinguishable from white oak when cut and could be used for the same purposes, including lumber, flooring, furniture, and timber. However, swamp white oak trees often have inferior quality to white oak.

LEAF: Obovate, alternate, 4-7 inches long with deep crenate margins. The undersides are white. By the end of late summer, the leaves commonly develop a powdery mildew. In the fall the leaves turn a crimson color.

TWIGS AND BUDS: Terminal buds are clustered and very small. Branchlets are flaky and develop distinct flares of bark.

FLOWER: Monecious with pollen-bearing catkins that develop in the mid-spring.

FRUIT OR SEED: Acorns develop in a single season and ripen in early to mid-autumn, usually in pairs on a long, thick stalk (1 to 3 inches), or stem. Acorns are oval with a small, scaly cup and ripen in early to mid-autumn.

BARK: When bark is mature it is ridged and furrowed giving off a light gray color.

SHAPE: Open, round-topped.

MATURE HEIGHT: 60-80 feet.

WHITE OAK

Quercus alba



This large native tree is one of the most important hardwoods found in Ohio and features some of the best fall colors among oaks. Its strong, waterproof wood is used for lumber, railroad ties, flooring, and furniture. White oak wood is also favored for barrel production. White oak acorns are a popular food source for wildlife, and are eaten, stored, and gathered by rodents, birds, and deer. Found in a range of habitats across the state, the white oak prefers full sunlight and deep, well drained, acidic to neutral soil.

LEAF: Alternate, slightly obovate, 5-9 inches long. Leaf shape is highly variable but often narrows at the base to create a wedge shape at the stem and consists of seven to nine finger-like rounded lobes. Lobes differ greatly in their width and length.

TWIGS AND BUDS: Buds are small and rounded, with a cluster of relatively large terminal buds.

FRUIT OR SEED: Acorns are about 1 inch long, chestnut-brown and enclosed at the end in a bowl-shaped, warty-scaled cup with a stalk.

BARK: Highly variable bark may be ridged, deeply furrowed, have small vertically aligned blocks or scales, and is light gray color.

SHAPE: Spreading.

MATURE HEIGHT: 70-100 feet.

DECIDUOUS

FAMILY BEAN

BLACK LOCUST

Robinia pseudoacacia



Black locust is native to southern Ohio but is now found throughout the state. It is a rapidly growing tree valuable for reclamation projects for fixing nitrogen in the soil and soil stabilization. Large trees are valued for their hard, strong logs to make fence posts, split rails, or railroad ties due to its rot-resistant properties, and for firewood. Black locust prefers rich, moist soils of variable pH and full to partial sun, though it is often found in poor soil conditions. This tree has a long list of potential problems including locust borer, leaf miner, bark canker, and trunk rot that can make it unsightly or unhealthy, often limiting its potential height. It is a good pollinator tree.

LEAF: Leaves alternate, pinnately compound with seven to 17 blue-green leaflets with smooth margins and silvery-gray below. Leaflet tips may be slightly notched or rounded. Fall color is yellow at best. Some premature leaf drop may occur during dry summers.

TWIGS AND BUDS: Twigs are brown to gray, zigzag, and brittle with short ($\frac{1}{2}$ to 1 inch), stout, paired spines at the leaf base. Buds are inconspicuous.

FLOWER: Showy white flowers occur in mid to late spring in drooping clusters from long stems and are sweetly fragrant, covering the tree canopy. Bees make honey from nectar of black locust flowers.

FRUIT OR SEED: A thin, flat brown pod, 2-4 inches long, usually containing four to eight seeds. Pods split into halves when ripe by mid-summer or hang on twigs through winter. Seeds are eaten by birds and other wildlife.

BARK: Bark is rough, deeply furrowed, and thick, ranging in color from gray to brown with olive green tints.

SHAPE: Upright to spreading.

MATURE HEIGHT: 50-70 feet.

HONEYLOCUST

Gleditsia triacanthos



This native tree is distributed throughout the state, commonly found along fencerows, in open fields, and along streams or river floodplains. Also known as thorny-locust, this long-lived tree is commonly planted as a shade tree (thornless variety) prized for its urban tolerance, filtered shade, and fast growth. Honeylocust is named for the sweet, honey-like substance found in its pods. Flowers are good for pollinators. It can adapt to a wide range of soil types, soil pHs, and moisture levels and is tolerant to many environmental stresses. Several major pests and pathogens such as trunk and root canker, webworms, mites, galls, and borers can cause significant problems to honeylocust, especially when many trees are planted in close proximity to one another, weaken-

ing trees after successive years of repeated infestation. Mixed plantings of diverse tree species discourage the rapid spreading of such problems.

LEAF: About 7-10 inches long, pinnately compound and often bipinnately compound. Leaflets up to 1½ inches long are oval, shiny dark green above and dull yellow-green below. Bipinnate leaves have four to seven pairs of pinnae, each with as many as 28 leaflets.

TWIGS AND BUDS: Twigs are slender, zigzag, and shiny, greenish-brown to reddish-brown in color, often covered with 2-4 inch branched thorns.

FRUIT OR SEED: Fruit is a flat brown seed pod resembling twisted leather straps, 7-15 inches long, sometimes reaching up to 18 inches in length. Both the pods and the large seeds are consumed by wildlife such as rabbits, deer, squirrels, and birds.

BARK: Dark brown or gray, divided in flat narrow plates. Long thorns can be found on the trunk.

SHAPE: Proportional spread to height.

MATURE HEIGHT: 50-70 feet.

KENTUCKY COFFEETREE

Gymnocladus dioica



The Kentucky coffeetree is easily recognized by its massive bipinnately compound leaves in the summer and by its bold outline in the winter. It can be found throughout Ohio but is primarily located in the alkaline soils of the western half of the state. As a member of the bean family, Kentucky coffeetree is related to redbud, honeylocust, black locust, and wisteria. Kentucky coffeetree prefers deep, moist, alkaline soils, but thrives almost anywhere it is planted, except for permanently wet soils. It is very tolerant to many stresses, including heat, drought, poor soils, compacted soils, high pH soils, occasional brief flooding, and air pollution. Its geographic range has been extended due to the extensive planting of this species in parks along the east coast.

LEAF: Alternate, bipinnately compound, 12-36 inches long, and composed of alternately arranged leaflets up to 3 inches long.

TWIGS AND BUDS: Twigs are stout, brown, with a thick salmon-colored pith. Large, heart-shaped leaf scars have one or two small lateral buds that are barely visible above the leaf scars. The terminal bud is absent.

FRUIT OR SEED: A flat thickened pod, 3-8 inches long and reddish-brown in color, contains six or more dark brown lima bean-sized seeds imbedded in a sticky pulp, and ripen in late summer.

BARK: Bark is gray, deeply furrowed into narrow scaly ridges. Salmon color on the underside of plates that curl from the side.

MATURE HEIGHT: 70-80 feet.

NORTHERN CATALPA

Catalpa speciosa



The northern catalpa was introduced to Ohio over 200 years ago to produce large amounts of lightweight, rot-resistant timber for fence posts. Because metal fence posts have largely replaced wooden fence posts, this rapid-growing tree is now primarily planted as an ornamental and shade tree. This massive deciduous tree prefers moist, deep, rich soils of variable pH and withstands summer heat well. The northern catalpa is relatively disease and pest free, but its slippery fruits can create a hazardous cleanup chore in urban areas and it often grows too large for its allocated space.

LEAF: Simple medium-green leaves are large, 6-12 inches long, heart-shaped, and usually without any lobes.

Arrangement around the stem is whorled (three leaves emerging around the same location along the stem) but sometimes opposite.

TWIGS AND BUDS: In the winter, stout twigs that have sunken leaf scars that resemble suction cups and whorled arrangement (three scars per node).

FLOWER: Flowering structure consists of a huge truss of individual perfect flowers, each one of which has a corolla composed of fused white petals with small amounts of yellow, orange, and purple.

FRUIT OR SEED: Some flowers give rise to long, thin, hanging fruiting pods, filled with numerous elongated seeds that are green in summer and persist as ripened brown pods throughout much of the winter.

BARK: Mature gray-brown bark varies from one tree to the next, with some being scaly, others ridged, and still others having the long ridges broken into rectangular blocky plates.

SHAPE: Narrow, open, and irregular crown.

MATURE HEIGHT: 70 feet.

BLACK BIRCH

Betula lenta



Also known as sweet birch or cherry birch, it is only native to a few counties in Ohio (notably Licking, Fairfield, Hocking, Vinton, Scioto, Adams, Ashland, Summit, Portage, and Trumbull). Named for its mature black bark that resembles black cherry, this tree is prized for excellent fall color and hard, heavy wood used as a finish wood or veneer in furniture manufacturing. Distillation of the bark and twigs produces natural wintergreen oil and fermented sap can be used to make birch beer. Black birch prefers moist, well-drained acidic soils, cool summers, and full to partial sun but can tolerate drier soils of variable pH. Black birch has many pathogens and pests that can damage trees including trunk rot, bark cankers, and bronze birch borer. If planted outside its

natural range, the tree undergoes environmental stresses that make it more vulnerable.

LEAF: Alternate, simple, elliptical to ovate, up to 5 inches long, and singly to doubly serrated on their margins with a heart-shaped base. Dark green and shiny in summer; bright yellow and gold in winter.

TWIGS AND BUDS: Green and somewhat downy when young, becoming reddish-brown, smooth and shiny. Twigs have a strong wintergreen scent if broken and are browsed by deer and rabbits. Buds are reddish-brown, conical, sharp-pointed, and shiny.

FLOWER: Immature catkins (male flowers) hang from winter twigs, predominating in the upper canopy.

FRUIT OR SEED: Small two-winged nutlets are held in a cone-like structure of scales about 1½ inches long.

BARK: Young branches have smooth, glistening, brown to red-brown to black bark in winter, with prominent, lighter-colored lenticels. Young trunks have the same traits, but transition to brown-black bark that break up into large plates and scales with age.

SHAPE: Pyramidal to rounded.

MATURE HEIGHT: 60-80 feet.

RIVER BIRCH

Betula nigra



The river birch is a tree usually found alongside bodies of water and is native in a few counties in southeastern Ohio. River birch is a popular shade tree, prized for its flaky ornamental bark. River birch grows best in wet to moist rich acidic soils and full to partial sun. This native tree is heat tolerant and resistant to bronze birch borer.

LEAF: Alternate, doubly serrated, and ovate, 2-3 inches long. The green, glossy leaves have a wedged or angular base. In the fall, leaves typically turn yellow.

TWIGS AND BUDS: Twigs are reddish-brown, slender, and usually pubescent. Buds are small, reddish-brown, and cone shaped. The terminal bud is absent.

FLOWER: The dormant catkins stay on the bare twigs during the winter. Female flowers emerge in spring and may pollinate with the male catkins.

FRUIT OR SEED: Fruit (called a strobile) is cylindrical and contains small nutlets that shed in spring resulting from the tree's flower.

BARK: Wild trees feature excessively flaky bark with orange to cream inner bark. The flaky orange to cream bark can be found on both young and mature tree trunks and branches, which allows for easy identification in winter.

SHAPE: Pyramidal to oval.

MATURE HEIGHT: 50-70 feet.

YELLOW BIRCH

Betula alleghaniensis



Yellow birch is named for its bronze-colored, thinly peeling bark that develops with maturity. It is most abundant in northeast Ohio and found locally elsewhere in the southeastern half of the state, including the Hocking Hills region. It prefers moist, rich, deep, well-drained acidic soils in sites that experience relatively cool summers. It may tolerate soils of alkaline or neutral pH. Yellow birch suffers from leaf diseases, trunk rot, bark cankers, and bronze birch borer, especially when growing outside of its natural range. The wood of yellow birch is valued for its heavy and hard nature and is used for veneer, cabinetry, doors, and floors.

LEAF: Alternate, simple, 3-5 inches long, pinnately veined, ovate to oblong, with doubly serrate margins. Leaf base is rounded, surfaces are dull, dark green, and glabrous above and pale yellow-green below with tufts of pubescence in the axils or principle veins. Petiole of the leaf is pubescent and fall color is yellow.

TWIGS AND BUDS: Twigs are slender, yellowish brown to dark brown, and hairy when young. Twigs have a distinct wintergreen taste, but the aroma of wintergreen is not as strong as black birch. Terminal buds are absent, lateral buds are ovate with chestnut brown scales, and numerous spurs on older growth.

FLOWER: Immature male catkins hang from twigs in the winter. Female flowers are formed within the lateral bud.

FRUIT OR SEED: Fertilized female flowers give rise to green cones about 1 inch long in the spring that later turn brown in the fall.

BARK: Bark on young branches is smooth and glistening, with prominent light-colored lenticels, and peels horizontally in thin curly strips likened to duck tails. Older bark develops red-brown scaly plates.

MATURE HEIGHT: 60-80 feet.

AMERICAN ELM

Ulmus americana



Once a prized ornamental and shade tree, American elm has been tragically impacted by Dutch elm disease in recent years. The non-native fungal pathogen (transmitted by the elm bark beetle) plugs the vascular system of the tree, preventing the flow of water and nutrients and slowly kills it. Also known as white elm, this stately native tree is found throughout Ohio and can be recognized by its distinctive vase shape. American elm prefers moist, deep rich soils of variable pH and full to partial sun. Fully mature specimens are becoming harder to find as most trees succumb to Dutch elm disease by the time they reach 40 feet tall. American elm is also subject to numerous pests and pathogens including elm phloem necrosis, which has symptoms similar to Dutch elm disease.

LEAF: Leaves are alternate, simple, 3-5 inches long, asymmetrical at the base, elliptical to ovate, and smooth or rough upper surface with prominent veins and doubly-serrated margins.

TWIGS AND BUDS: Twigs are generally smooth, slender, zigzag, brown, and slightly hairy. Buds are small, smooth or slightly hairy, and similar to twig color.

FRUIT OR SEED: Seeds are surrounded by an oval, thin papery wing, ½ inch long, and deeply notched at the tip, ripening in spring and borne in clusters.

BARK: Dark gray to gray-brown with flattened ridges and intervening furrows; separated by diamond-shaped fissures on older trees. Outer bark, when sectioned, shows alternating brown and cream-colored layers. Bark can be thick and often spongy.

SHAPE: Vase.

MATURE HEIGHT: 80-120 feet.

DECIDUOUS

FAMILY ELM

HACKBERRY

Celtis occidentalis



Hackberry is a native tree that is easily recognizable from a distance by its light gray, warty bark on massive trunks. Hackberry frequents fencerows, fields, and wastelands, and grows naturally near bodies of water, including floodplains and drainage ditches. It prefers moist, well drained soils of variable pH but can adapt to a variety of sites, including soils that are wet or dry, clay or rocky, rich or poor. It is very pollution tolerant.

LEAF: Alternate, 3-5 inches long, asymmetrical at the leaf base, and have curving, pointed tips with serrated margins. Fall color is green to yellow and usually insignificant.

TWIGS AND BUDS: Twigs are slender, zigzag in appearance, with small leaf scars. Terminal bud is absent and lateral buds are light brown and triangular in shape with three to four bud scales.

FRUIT OR SEED: Small, rounded, green droops on stalks (up to 1 inch) develop in summer and become purple or brown fruits by late autumn. Most fruits are consumed by birds in the autumn, but a few may survive the winter and still be present the following spring.

BARK: Bark is light gray and covered with warty or cork-like projections.

SHAPE: Ascending or spreading canopy.

MATURE HEIGHT: 60-80 feet.

SLIPPERY ELM

Ulmus rubra



Also known as red elm, this tree is similar in many ways to American elm but differs in its branching habit, leaf texture, and wood color. While its geographic distribution is almost the same as American elm, slippery elm is more commonly found in the slightly drier soils of uplands, although it may be found near American elm in areas with sufficient moisture. This fast-growing native tree is named after its slick, gummy inner bark, which was chewed by the Native Americans and pioneers to quench thirst. It is used today as an ingredient in cough drops and teas for treating sore throats. Its strong reddish-brown wood is used for furniture, boxes, and construction materials. It prefers moist, deep soils of variable pH but can be found on dry soils of average composition.

Slippery elm is subject to numerous pests and pathogens, including Dutch elm disease and elm phloem necrosis, though not as severely as American elm.

LEAF: Alternate, simple, 4-6 inches long, rough, sandpaper-like surface on both sides, with asymmetrical bases and doubly-serrated margins. Ovate or elliptical in shape, yellow color in the fall.

TWIGS AND BUDS: Twigs are stout, grayish, hairy, rather rough, and slightly zigzag. Floral and vegetative buds occur at base and tops of twigs, respectively. Dark buds contrast the light gray twigs.

FRUIT OR SEED: Round, papery winged fruits up to 1 inch across with small hairs on both sides where the central seed is located, but not on the edges. Fruits fall off soon after maturation in mid-spring.

BARK: Light-gray brown with flattened ridges and intervening furrows. Bark does not show buff colored streaks when sectioned. Inner bark is sticky and slippery to the touch.

SHAPE: Vase.

MATURE HEIGHT: 60-70 feet.

DECIDUOUS

FAMILY EBONY

PERSIMMON

Diospyros virginiana



Persimmon is native to the southern and eastern part of Ohio but can be planted farther north due to its cold tolerance. It is known primarily for its large edible fruits, which are consumed by humans and wildlife including opossums, skunks, deer, birds, and raccoons. Its hard, dense wood was historically used to produce wooden golf club heads and billiard cues. Persimmon prefers moist, well-drained, average soils of variable pH and full to partial sun, but easily adapts to poor, rocky, clay, sandy, or even organic soils of dry or moist constitution. Aside from being slow-growing and the potential in heavy fruiting years to create a sticky mess at the bottom of female trees, persimmon is relatively free.

LEAF: Alternate, simple, oblong to elliptical, 4 to 6 inches in size, medium to dark green with pale undersides in summer, sometimes with hints of yellow-orange, and purple or red during fall but usually fading to light green or chartreuse and abscising during autumn.

TWIGS AND BUDS: Twigs are slender, light brown to gray, maybe scabrous or pubescent with no true terminal bud and prominent twig scars. Buds are triangular, appressed, dark red to black with two bud scales.

FRUIT OR SEED: Plum-like berry that changes from green to pink-orange when ripe in autumn, up to 2 inches in diameter, and contains several flat dark brown seeds. Fruit is sweet and edible when ripe after a hard freeze and matures in mid to late fall.

BARK: Mature bark is thick and blocky in texture and dark gray in color.

SHAPE: Slender, oval-rounded crown.

MATURE HEIGHT: 40-60 feet.

DECIDUOUS

FAMILY HORSECHESTNUT

OHIO BUCKEYE

Aesculus glabra



The official state tree of Ohio, the Ohio buckeye's name comes from the appearance of its seed, which resembles the eye of a buck deer. The bitter seeds are poisonous to humans if consumed in large quantities, but not to wildlife including squirrels and deer. This deciduous native tree is found primarily as a smaller understory tree in western Ohio but is scattered throughout eastern portions of the state, reaching up to 60 feet in height in the open. The Ohio buckeye prefers moist, well-drained soils of variable pH in partially sunny to partially shaded conditions. Its light, soft wood was historically used for pulpwood, woodenware, and the production of artificial limbs.

LEAF: Opposite, 4-6 inches wide, palmately compound with five long, narrow leaflets attached at a common point. They are very prone to scorching, discoloration, and leaf diseases, often resulting in a brown, fall-like appearance to foliated canopy in summer if they are not nearly defoliated. This tree is one of the first to leaf out in spring and one of the first to lose its leaves in the fall.

TWIGS AND BUDS: Dormant buds can resemble those of yellow buckeye, but up close they feature overlapping scales that resemble the keel of a boat. Large terminal buds a good identifier of this tree. Twigs are stout and odorous when scratched; end branches typically curve upwards.

FLOWER: Showy, yellow-green flowers which emerge in early spring in short clusters with long, extending stamens.

FRUIT OR SEED: Spiny or warty fruit capsules usually contain one to three dark-brown, shiny nut-like seeds that each feature a characteristic pale basal scar or eye.

BARK: Variable, but broken into subtle flaky ridges, fissures, and long, warty plates with age. Light gray to light brown in color, without the rectangular platy appearance of yellow buckeye.

SHAPE: Rounded.

MATURE HEIGHT: 40-60 feet.

YELLOW BUCKEYE

Aesculus flava



The tallest of all buckeye trees, the yellow buckeye is found almost exclusively in southeastern Ohio. Its wood was historically used for furniture, crates, boxes, artificial limbs, and caskets. The primary wildlife value of this tree is for shelter and nesting sites; fruit and twigs have little value. Though this native tree prefers moist, well-drained, acidic soils, it can adapt to average soils that are occasionally dry and of neutral to alkaline pH. The yellow buckeye tolerates shady conditions in youth but grows in full sun to partial sun at maturity. It is relatively healthy and typically planted as both a shade and ornamental tree.

LEAF: Opposite, palmately compound with five to seven leaflets, coarsely-toothed margins, and a petiole up to 10 inches long. Fall color is yellowish-green to orange.

TWIGS AND BUDS: Winter buds are not sticky or shiny and covered with smoothly overlapping scales, rather than having scales that are ridged or flared like the Ohio buckeye. Twigs are stout, with a large shield-shaped leaf scar, orangish lenticels; terminal buds are orangish brown, about $\frac{3}{4}$ inch long with a sharp point. If twig is cut or crushed, no foul odor is emitted, as is the case with the Ohio buckeye.

FLOWER: Flowers are pale yellow and appear in upright clusters 5-6 inches long in April and May.

FRUIT OR SEED: Smooth, thick, leathery husks enclosing one to three smooth chestnut-brown, shiny buckeye seeds with a large, lighter brown spot on one side; develop on a stout, terminal stalk and look similar to a potato.

BARK: Initially smooth, light grayish brown and often quite splotchy. Breaks into flaky rectangular plates with age, revealing a lighter-colored interior bark.

SHAPE: Upright oval.

MATURE HEIGHT: 60-80 feet.

SASSAFRAS

Sassafras albidum



This native tree is found throughout Ohio, particularly in fence rows and abandoned fields. The sassafras is a rapidly growing colonizer and forms thickets primarily by root sprouts several feet away from the parent plant. Its roots, leaves, twigs, and fruit have a pleasant odor. Traditionally, oil from the trunk bark or roots was used in perfuming soaps, while sassafras tea and root beer flavoring were made using the bark of roots. Although sassafras can have several minor diseases and pests, it is most commonly affected by moderate chlorosis in alkaline soils and storm damage to brittle twigs and branches.

LEAF: Alternate, dark green leaves are 4-6 inches long, smooth, and produce a characteristic sweet aroma when rubbed or crushed. Leaves vary on the same tree from having no lobes to being two- or three-lobed. The two-lobed leaves resemble mittens.

TWIGS AND BUDS: Young twigs are bright green, turning reddish in color as they grow, maintaining a smoother and shiny texture. Twigs have large white pith. Terminal buds are much larger than the lateral buds, with many loose scales.

FRUIT OR SEED: Clustered fruits are green when immature and ripen to shiny, round dark blue-black drupes about ½ inch spuce in diameter, appearing on a red stem enlarged at the point of attachment and quickly eaten by wildlife.

BARK: Young bark is usually furrowed and greenish-brown; mature bark is gray-brown with reddish inner bark, deep furrows, and interlacing ridges.

SHAPE: Irregular.

MATURE HEIGHT: 30-60 feet.

AMERICAN BASSWOOD

Tilia americana



The native American basswood can be found throughout Ohio. When in bloom, the flowers of the American basswood attract bees that turn the nectar into a high-quality honey. This tree's wood is weak, odorless, and lightweight, making it an ideal choice for crates and boxes used to store food. The inner bark of the tree is very tough and was used by the Native Americans to create ropes, mats, and bandages. American basswood is prone to insects and disease, particularly leaf-chewing insects like the Japanese beetle.

LEAF: Alternate, oval leaves are 3-4 inches wide, 3-7 inches long, and roughly toothed with an asymmetrical, heart-shaped base. In the fall, the leaves turn from green to various shades of yellow.

TWIGS AND BUDS: Twigs have a zigzag growth pattern and may be green to red, with older twigs being shiny gray. Buds usually range from reddish brown to bright red to green in winter, and the terminal bud is false.

FLOWER: Small, perfect creamy flowers open in early summer; they are noted for their fragrance and nectar.

FRUIT OR SEED: Hard, rounded fruits hang suspended in clusters from a stalk attached to a leaf-like bract. Fruits ripen by late summer and are often eaten by wildlife.

BARK: Young bark is smooth, shiny, and light gray. Mature bark is lightly fissured and medium gray to brown in color. Mature bark ridges are usually flattened and straight or interlacing.

SHAPE: Shape ranges from oval to irregular; lower limbs are pendulous but upswept at tips.

MATURE HEIGHT: 70-90 feet.

DECIDUOUS

FAMILY MAGNOLIA

CUCUMBERTREE

Magnolia acuminata



Cucumbertree is by far the most common of the three native magnolias found in Ohio forests. Also called cucumber magnolia, it is named for its often-contorted fruits, which vaguely resemble cucumbers in their shape. The cucumbertree prefers moist, deep well-drained soils of slightly acidic pH and full to partial shade. It can adapt to average soils of neutral or alkaline pH, but does not like prolonged drought, wet soils, or city pollution.

LEAF: Medium green leaves are large, 6-10 inches long, alternate, simple, smooth above, downy beneath, and ovate with smooth or somewhat wavy margins. Fall color is often yellow to brown and insignificant.

TWIGS AND BUDS: Twigs are reddish-brown and shiny with a peppery smell and taste. Buds are silvery-green, fuzzy, and form by mid-summer.

FLOWER: Large greenish-yellow, single, upright flowers appear from April to June; can easily blend with spring foliage and mostly occur in upper canopy.

FRUIT OR SEED: Immature green fruits resemble a small green cucumber. By late summer and early autumn, the remaining fruits mature to a red color with scarlet red seeds. Songbirds, squirrels, and mice eat the seeds.

BARK: Gray-brown to brown, developing long, narrow furrows and loose scaly ridges with age.

SHAPE: Rounded to broadly rounded.

MATURE HEIGHT: 60-80 feet.

YELLOW POPLAR

Liriodendron tulipifera



Also known as tuliptree or tulip poplar, this tall native tree is found throughout Ohio and named for its distinct tulip-shaped flowers and leaves. Yellow poplar grows rapidly and frequents moist woodlands, especially on lower slopes. It is planted as a fast-growing ornamental tree, and its lightweight, olive-green wood is often used as a base for veneer. It prefers moist, well-drained soil but adapts to drier soils of neutral to alkaline pH. Yellow poplar can suffer from a variety of pests and diseases, with magnolia scale and yellow poplar weevil being the most significant pests. Its interior leaves will yellow when the soil is too dry.

LEAF: Alternate, simple, 5 to 7 inches in size, generally four-lobed, with squared off, broadly notched tips, changing from bright green to vibrant yellow in autumn.

TWIGS AND BUDS: Twigs are green to purplish in summer; reddish-brown and shiny in winter. Winter terminal buds are flattened, smooth, with non-overlapping scales, and they resemble a duck bill. Spongy, white diaphragmed pith.

FLOWER: Bloom in May and June, with large tulip-shaped flowers with six greenish-yellow petals and a splash of orange at the base. Provide nectar for hummingbirds.

FRUIT OR SEED: At first green, turning light brown when ripe in autumn; upright cone-like, 3 inches long, aggregate of winged seeds. Serve as food for birds, squirrels, and mammals in winter.

BARK: Immature smooth gray bark becomes striated (with vertical lines) before it develops the deep fissures and tall, interlacing ridges that characterize the mature bark of this species. Young trees are dark green and smooth, older trees are dark gray and furrowed.

SHAPE: Symmetrical and pyramidal; known for its long, straight trunks lacking lower branches.

MATURE HEIGHT: 80-120 feet.

SUGAR MAPLE

Acer saccharum



This popular shade and ornamental tree is located throughout Ohio and known for exceptional red, yellow, or orange fall colors. Valued for its hard, dense wood, and for its sap which can be boiled and concentrated into syrup. This native tree can survive in full shade and prefers soil that is moderately deep, moist, and well drained. Sugar maples do not thrive in urban conditions. Twigs are commonly browsed by deer and seeds are consumed by squirrels.

LEAF: Opposite leaves with long petiole, 3-5 inches across, rounded at the base with five lobes. Each lobe is sparsely incised or toothed.

TWIGS AND BUDS: Buds are sharply pointed with tightly overlapping dark brown-blackish scales. Twigs are light brown to gray, with opposite branching.

FRUIT OR SEED: Paired, almost parallel winged seeds, or samaras, that ripen in autumn and twirl like propellers when they fall.

BARK: Thick light gray to brown and broken by vertical furrows into plate-like scales, but highly variable in color and appearance with increasing age. Salmon-pink color under bark plates and in fissures.

SHAPE: Upright oval shape.

MATURE HEIGHT: 70-100 feet.

RED MAPLE

Acer rubrum



This abundant ornamental tree features something red in each season. It prefers moist or wet, acidic soils and full to partial sun but can be found in many different habitats. Red maples do not thrive when transplanted into alkaline clay soils, making them susceptible to pest or pathogen damage. Its fruits, shoots, and leaves are heavily consumed by deer and rodents.

LEAF: Opposite, simple, 3-5 inches long and wide with three to five shallow lobes. Fairly long petioles with silvery, waxy coating. Coarsely toothed, light green above with pale green to whitish undersides; brilliant red or orange in autumn.

TWIGS AND BUDS: Buds are blunt and red. Twigs are slender, glossy, and change from green to red and reddish-brown with age. Upright branching when young but rounded with age.

FLOWER: Red, wind-pollinated flowers that form long pedicels and develop into paired winged fruits.

FRUIT OR SEED: Predominately monoecious, paired, winged fruit is red and v-shaped, ripening on drooping stems in late spring or early summer.

BARK: Light gray and smooth on younger trees. Older tree bark is darker, developing thicker furrows and scales with age to give a twisted, ragged appearance.

SHAPE: Rounded.

MATURE HEIGHT: 50-80 feet.

DECIDUOUS

FAMILY MAPLE

SILVER MAPLE

Acer saccharinum



The native silver maple is aptly named for its silvery leaf undersides and pale gray bark. This common tree has rapid growth and the ability to adapt to a wide range of soil conditions and moisture types, although it prefers wetland areas. Its buds are eaten by squirrels in early spring, and these trees provide nesting sites for ducks and other birds. Though generally a healthy tree, silver maples can be infected by several pests and diseases and are prone to storm damage or limb breakage.

LEAF: Dark green with silver undersides, 4-7 inches long and wide, opposite with long petioles, five lobes with deep sinuses, each of which is incised and serrated.

TWIGS AND BUDS: Twigs are odorous and reddish-brown at end of first year's growth but turn to silvery gray by the second year's growth.

FRUIT OR SEED: Winged, paired fruits hang in greenish-yellow or reddish-yellow clusters each spring.

BARK: Smooth and silvery when immature, forming long, shaggy rough scales with age. Mature bark is gray-brown with exterior scales and orange interior bark.

SHAPE: Dense and spreading.

MATURE HEIGHT: 60-90 feet.

BOXELDER

Acer negundo



Boxelder is the only maple tree native to Ohio with compound leaves and is found throughout the state. While it provides little commercial value today, the name boxelder comes from its former usage in the manufacturing of wooden crates, pallets, and boxes. The fast-growing boxelder is best utilized as a quick cover for sites subject to erosion or as a non-evergreen windbreak. Its adaptability to a wide range of soils and moisture levels in both rural and neglected urban areas accounts for its widespread distribution. Boxelder is plagued by many problems including leaf anthracnose, bark canker, trunk heart rot, boxelder bug, leaf scorch, and storm damage. Trees often have a lifespan of 30 years or less, but grow quickly in their first 15 years.

LEAF: Opposite, pinnately compound, with three to seven leaflets. Leaflets are bright green and coarsely toothed on their margins; the terminal leaflet may be shallowly lobed or a fusion of three leaflets. Some leaves drop prematurely in summer, and autumn color on the remaining leaves is a poor green-yellow and often scorched brown at the edges from the summer's heat and drought.

TWIGS AND BUDS: Winter twigs are smooth and green to green-purple (sometimes with a whitish cast). Buds are rounded, white, and woolly.

FRUIT OR SEED: Paired, v-shaped winged fruits hang in drooping clusters from female trees from summer through autumn. Composed of a long, flattened anchoring seed attached to a thin, elongated wing, fruits spin like propellers when they fall in autumn and winter.

BARK: Bark is pale gray or light brown, deeply divided, and forms interlacing scaly ridges and furrows with increasing age.

SHAPE: Broadly round.

MATURE HEIGHT: 50-75 feet.

OSAGE ORANGE

Maclura pomifera



Introduced to Ohio during the 1800s, Osage orange is commonly found in rural areas in fields and fence rows. This deciduous tree's common name is derived from the Osage Native American tribe and its bright green, warty fruits, also known as hedge apples. Its strong, flexible wood is used to make archery bows and fence posts. Most parts of the tree exude a sticky white sap containing latex when wounded or cut. Osage orange thrives in hot, dry summer conditions and poor soils, though it is adaptable to a wide range of soils and moisture levels.

LEAF: Leaves are 3-4 inches long and bright green to dark green, alternate, shiny, and ovate to broadly elliptical, with smooth margins and a drawn-out tip. Fall

color ranges from green-yellow to bright yellow. Leaves change color and drop from the tree later than most other trees, usually in November and December.

TWIGS AND BUDS: Twigs have thorns measuring ½ inch, with branches interlacing in the crown.

FRUIT OR SEED: Female trees produce large, rough-surfaced, lime-colored spheres containing many interior seeds relished by squirrels. The enormous fruits weigh down the branches by late summer and fall beneath the tree when ripened, serving as a good identification characteristic.

BARK: Mature bark has flattened and interlacing brown-gray ridges with deep orange furrows. This tree develops a flared basal trunk that merges with the large surface roots. When found at stream banks, the exposed roots of Osage orange are bright orange.

SHAPE: Arching and spreading.

MATURE HEIGHT: 50-60 feet.

DECIDUOUS

FAMILY MULBERRY

RED MULBERRY

Morus rubra



Red mulberry is a native Ohio tree. Its red to purple fruit is sweet and a food source for humans and wildlife alike and can be used for pies, jams, wine, and more. Wildlife serve as the mechanism for their dispersal. Red mulberry adapts to many types of soils of various pHs and moisture conditions, and it grows in full sun to partial shade. Many pests and diseases can affect red mulberry, but none seem to slow their rapid growth rate.

LEAF: Dull dark green leaves, 4 to 6 inches long, are alternate, broadly oval, serrated or toothed. Leaves vary from having no lobes to up to five lobes (often two to three lobes) with uneven bases. Multiple leaf shapes can be seen on the same branch, making them polymorphic. Leaf upper sides are rough with hairy undersides, unlike smooth and glossy white mulberry leaves.

TWIGS AND BUDS: Twigs grow rapidly with prominent winter buds and pale lenticels. Buds have many scales (four to eight).

FRUIT OR SEED: Fruits are red, purple, or black when immature and red-black when maturing in the summer. Berries resemble blackberries and are approximately 1 inch long, sweet, and edible, relished by squirrels, birds, and other mammals.

BARK: Young golden-brown bark becomes lightly fissured, eventually forming long, flat ridges and narrow fissures on scaly mature bark.

SHAPE: Open and gangly.

MATURE HEIGHT: 40-60 feet.

GREEN ASH

Fraxinus pennsylvanica



Green ash was historically one of the most common and rapidly growing woodland trees in Ohio and a popular shade tree, but it has experienced widespread mortality due to the exotic invasive beetle, the emerald ash borer. Named for its greener fall coloration, this native tree is one of the first to change color and drop its leaves in autumn. Green ash is very adaptable to a wide range of soil types, soil pHs, and moisture levels. It is noted for being extremely tolerant to a range of environmental stresses and grows in full sun to partial sun.

LEAF: Leaves are 6-10 inches long, opposite, pinnately compound, and have five to nine leaflets (usually seven). Leaflets are medium-green to dark green in color, usually finely serrated on the upper half of margins, and have either no stalks or very short stalks attached to the central rachis. Fall color occurs in very early autumn and is usually green-yellow or golden-yellow in good years.

TWIGS AND BUDS: Twigs are stout, gray to green-brown. Fallen leaves reveal circular or D-shaped leaf scars on twigs; lateral buds lie above leaf scars.

FRUIT OR SEED: Individual winged fruits are composed of a thin, elongated anchoring seed attached to a narrow wing, hang in clusters from female trees, and spin when they fall. Seeds are eaten by finches and cardinals.

BARK: Young bark is usually flaky and forms tall interlocking ridges and deep furrows with age, yielding a classic diamondback pattern on the mature bark.

SHAPE: Upright oval to upright rounded.

MATURE HEIGHT: 50-60 feet.

DECIDUOUS

FAMILY OLIVE

WHITE ASH

Fraxinus americana



White ash was once a common, rapidly growing native tree popular for its shade value and dependable fall color, but it has experienced widespread mortality due to the exotic invasive beetle, the emerald ash borer. Its strong, heavy wood is harvested to make baseball bats, tool handles, furniture, and firewood. White ash prefers rich, moist, well-drained acidic soil of acidic to neutral pH and full to partial sun.

LEAF: Opposite; compound; 8-12 inches long; usually with seven leaflets, each 3-5 inches long. Leaves are short stalked, silvery beneath, margins entire or with a few rounded teeth toward the tip.

TWIGS AND BUDS: Twigs are stout, usually smooth, gray-brown with a few pale lenticels and a white, waxy coating which is easily rubbed off. Buds rusty to dark brown, blunt with adjoining leaf scars that are U-shaped.

FRUIT OR SEED: Winged fruits hang in clusters, each composed of a plump anchoring seed attached to a wing. Ripe fruits are 1-2 inches long, shaped like a canoe paddle with a rounded tip, and spin when they drop in autumn.

BARK: Gray-brown, evenly furrowed into diamond shaped areas separated by narrow interlacing ridges, slightly scaly on very old trees. Mature bark is similar in appearance to green ash bark.

SHAPE: Upright oval to upright rounded.

MATURE HEIGHT: 70-80 feet.

AMERICAN SYCAMORE

Platanus occidentalis



The American sycamore is a massive tree easily identified by its height, spreading canopy, and unique bark. Its wood was historically used for lumber, butcher blocks, flooring, and handles. This native tree prefers deep, moist, well- or moderately-drained soils of variable pH and full to partial sun; it is often found naturally along rivers and streams. The American sycamore is prone to annual infections of anthracnose, a fungus that destroys new growth in spring by causing leaf dieback and forces a second round of growth in late spring.

LEAF: Alternate, simple, three to five lobed with varying number and size of incisions, 5-8 inches across. Leaf shape is variable but generally wider than long; leaves are medium green above with light pale or wooly undersides. Leaf petioles swollen at base.

TWIGS AND BUDS: Twigs are green and hairy at first, then brown and smooth. They grow in a zigzag pattern with absent terminal buds and prominent, smooth reddish-brown winter buds. Leaf scars surround the entire bud. Branches ascend and grow quickly in the upper canopy but remain pendulous in the lower reaches.

FRUIT OR SEED: A round, light brown ball, 1 inch in diameter, made up of many seeds surrounded by silky hairs, hanging singly by a tough, slender stalk throughout the winter.

BARK: Smooth, whitish bark peels off in irregular patches from upper branches to reveal darker bark underneath, creating a characteristic gray, green, and brown mosaic.

SHAPE: Open, massive crown.

MATURE HEIGHT: 70-110 feet.

BLACK CHERRY

Prunus serotina



The rapid-growing black cherry tree is common throughout Ohio and is often found in open fields and previously harvested forests. This deciduous woodland tree is known for its beautiful, fine-grained heartwood which is commonly used for wood furniture, cabinetry, interior trim, and veneer. The largest native cherry tree, black cherry grows quickly due to its prolific fruit and seed distribution but is intolerant to competition for sunlight. It prefers deep, moist, well-drained soils of variable pH under full to partial sun conditions, but can also tolerate poor, dry soils with a reduced growth rate. Black cherry is susceptible to damage from the cherry scallop shell moth and the eastern tent caterpillar. The twigs, leaves, bark, and seeds of black cherry may poison livestock if ingested, however deer are able to eat them without harm.

LEAF: Leaves are 2-5 inches long, lustrous and dark green on top and pale below with pubescence on the midrib. They are alternate, simple, narrowly oval or oblong, and have fine serrations along their margins.

TWIGS AND BUDS: Twigs are shiny, thin, reddish-brown and dotted with prominent lenticels. Smooth branchlets and branches with striking horizontal lenticels.

FLOWER: White, 4-6 inches long cylindrical structures that bloom in mid-spring, attracting many bees and later giving rise to fruits.

FRUIT OR SEED: Small dark red or purple cherries are eaten prematurely by birds and mammals in summer, while remaining fruits turn black and are sweeter, softer, and juicier.

BARK: Young bark is smooth with narrow horizontal lenticels, becoming dark brown to black with small irregular scaly plates.

SHAPE: Symmetrical during growth becoming irregular through maturity.

MATURE HEIGHT: 60-80 feet.

BLACKGUM

Nyssa sylvatica



Also known as black tupelo, this native tree is found in all of Ohio except for the driest northwestern counties. This tree is known for its glossy, dark green summer foliage, characteristic blocky bark, and stunning red fall color. Its hard-to-split wood is used for lumber, veneer, boxes, and pulpwood. Black tupelo prefers moist, well-drained, rich, deep, acidic soils and full to partial sun but adapts surprisingly well to dry, average, alkaline soils and partial shade. This tree has several minor diseases and pests, including black leaf spot. Stunting of growth and chlorosis of foliage will occur if this species is planted in alkaline soils.

LEAF: Alternate, simple, 2-5 inches long, elliptical to slightly obovate leaves with entire and slightly thickened margins, dark green and shiny above, often downy beneath, turning mostly bright red but occasionally shades of yellow, orange, and purple in early autumn.

TWIGS AND BUDS: Small twigs are smooth, short, grayish to reddish brown; pith white and diaphragmed. Leaf scars have three clearly visible bundle scars. Buds are round, pointed and multi-colored, ¼ inch long.

FRUIT OR SEED: A dark blue drupe, ½ inch long, single seeded with thin flesh, borne singly or in a cluster, ripening in autumn. Eaten by many forms of wildlife.

BARK: Immature bark is brown to gray-brown, with light furrows and a ridged to shingled appearance. Mature bark is medium gray, smooth to scaly, and has distinctly flat-topped blocks with deep crevices in-between and can fissure into quadrangular blocks called alligator bark on very old trunks.

SHAPE: Uptight oval, irregular canopy. Branching on young trees tends to stand at right angles to the trunk.

MATURE HEIGHT: 40-80 feet.

BUTTERNUT

Juglans cinerea



This slow-growing native tree, also known as white walnut, can be found throughout Ohio. Its kernel within the fruit gives it the common name of butternut, as it is sweet and very oily. Native Americans reportedly boiled the kernels to extract the oil, which was then used like butter. The kernels were also pickled in vinegar by early settlers. Nuts are still prized for their buttery taste and used for baking, confections, and fresh eating. Its light, soft wood is pinkish tan in color when split and is used for furniture and veneer. Butternut prefers deep, moist, rich, well-drained soils under sunny conditions, especially the bottomlands of rivers and creeks. Butternut canker has greatly reduced the tree's natural occurrence.

LEAF: Alternate, pinnately compound leaflets 15-25 inches in length, nine to 19 leaflets and present terminal leaflet. Leaves are pungent when bruised, and its rachis and petioles are covered with sticky hairs. Fall color is yellow but usually insignificant. Leaves may drop prematurely due to summer drought.

TWIGS AND BUDS: Twigs are greenish-gray to tan, stout with obvious hairiness, and have a dark brown chambered pith.

FRUIT OR SEED: Yellow-green sticky husk, oblong in shape (egg-shaped), usually maturing in summer and containing an oval, light brown, creased nut. The nut kernel is oily, sweet, and edible. Nuts are consumed most commonly by squirrels.

BARK: Light, ashy to silvery gray, smooth when young and developing flat-topped shiny ridges and deep furrows with age.

SHAPE: Round-topped.

MATURE HEIGHT: 60 feet.

BLACK WALNUT

Juglans nigra



A large deciduous tree found throughout the state, black walnuts are arguably Ohio's most valuable hardwood tree. Its fine-grained, chocolate-brown, relatively light-weight wood is the ultimate choice for making solid wood furniture, interior trim, gunstocks, and high-quality veneer. The large nut contained beneath the husks of black walnut is enjoyed by humans as well as woodpeckers, foxes, and squirrels. This native tree prefers deep, moist, rich soils under sunny conditions and is deeply taprooted, making transplanting difficult. Aside from leaf spot, black walnut is virtually disease and pest free. Black walnut produces a chemical toxic to some plants, and can poison nearby competition.

LEAF: Leaves alternate, pinnately compound, and range from 12-24 inches long with 11-23 sharply-oval, toothed, long-pointed leaflets. The terminal leaflet at the end of the long leaf is frequently long or absent and the leaves have a strong, distinct odor when rubbed or bruised.

TWIGS AND BUDS: Twigs are stout and orange-brown to dark-brown with a chambered pith, and prominent terminal buds. Buds are gray and downy and leaf scars are large and hairless.

FRUIT OR SEED: Globular inner kernels or nuts are surrounded by a hard, round shell composed of two fused

halves. The shell and fruit are surrounded by a thick outer husk that is yellow-green when immature and yellow-black when ripe. Dark-colored dye can seep from ripe fruits and easily stain skin and clothing.

BARK: Bark color ranges from brown-gray to gray-black, with a chocolate brown color underneath when scraped, flaky when young but ridged and furrowed with age. Narrow bark ridges form an interlacing diamondback pattern and develop thick, warty plates.

SHAPE: Upright rounded.

MATURE HEIGHT: 60-85 feet.

BITTERNUT HICKORY

Carya cordiformis



This large native tree is distributed throughout the state and is named for its nuts, which are too bitter for human and wildlife consumption. Bitternut hickory prefers rich, moist sites such as bottomlands but is often found in drier conditions and adapts to acidic, neutral, or alkaline soils. It can tolerate shade in youth but needs full sun for optimal growth at maturity. Bitternut hickory is virtually problem and pest free. Smoke from hickory wood can be used to give food a popular flavor. The strong and heavy nature of hickory is unlike any other commercial wood and makes it suitable for tool handles.

LEAF: Leaves are alternate, pinnately compound, up to 1 foot long, and usually display seven narrow, lance-shaped leaflets (ranging from seven to 11), with fine serrations on their margins. Spring and summer leaf color is medium green to dark green, while fall color is often golden.

TWIGS AND BUDS: Twigs are slender, smooth, glossy, orange-brown to grayish with numerous pale lenticels. Terminal buds are a distinctive sulfur-yellow color, ½ inch long, composed of non-overlapping scales.

FRUIT OR SEED: Fruit is composed of a bitter innermost kernel protected by a hard shell with four ribs, surrounded by a thin, winged outer yellow husk which splits into four sections almost to the middle when ripe.

BARK: Light gray bark remains rather smooth for many years, eventually developing shallow furrows and low, narrow interlacing ridges. Bark does not peel like shag-bark or shellbark hickories.

SHAPE: Slender.

MATURE HEIGHT: 60-90 feet.

MOCKERNUT HICKORY

Carya tomentosa



Mockernut hickory is a long-lived native tree found primarily in eastern and southern Ohio. Its common name refers to its deceptively large, thick-shelled fruits which contain very small kernels. This large tree grows well on rich, moist, well-drained soils of upland areas. Its hard, tough wood is used for tool handles, furniture, and fuelwood. Mockernut hickory nuts are eaten by squirrels, birds, mice, and deer and moths feed on its leaves.

LEAF: Alternate, pinnately compound, 9 to 14 inches in length with seven to nine serrate, pointed leaflets; usually green above with pale undersides. Leaf rachis are stout and hairy. Golden-yellow fall color.

TWIGS AND BUDS: Twigs are stout, brown to dark gray, hairy at first but later smooth with prominent leaf scars and large, broadly oval-shaped terminal buds with deciduous outer scales.

FRUIT OR SEED: Fruits mature in fall and are elliptical to oval, up to 2 inches long with a thick red-brown husk (about $\frac{1}{4}$ inch) containing a thick, four-lobed nut with sweet and edible meat.

BARK: Initially gray and smooth, later developing interlaced round-topped, light gray ridges and shallow, darker furrows, never shaggy or exfoliating.

SHAPE: Oval.

MATURE HEIGHT: 60-90 feet.

PIGNUT HICKORY

Carya glabra



Pignut hickory is named for its kernel, which is usually bitter and fit only to be eaten by animals. This slow-growing tree grows well in rich, well-drained to dry soils. It occurs with other hickories and with oaks, characteristically on hillsides and ridges. Pignut hickory is found throughout Ohio. Its hard, strong wood is used for tool handles and athletic equipment. Its nuts are too bitter for human use but preferred by squirrels and chipmunks. Pignut hickory is drought tolerant and can grow well in sand or clay soils.

LEAF: Broad, flat, alternate, and pinnately compound, 8 to 12 inches long with five leaflets; leaflets are narrow and oval shaped with a serrated end. Green in color above and pale below. Golden yellow fall color.

TWIGS AND BUDS: Twigs are slender and dark reddish brown with numerous pale lenticels. Leaf scars are three-lobed, and the terminal bud is small, oval, and light brown.

FRUIT OR SEED: Fruit is oval to pear shaped, light green, 1 to 2 inches long with a thin husk that partially splits when ripe in fall. Nuts are brownish-white, fairly round, and thick-shelled with bitter kernels. The narrow end of the fruit with husk is sometimes likened to a pig snout.

BARK: Initially smooth and gray, soon developing scaly narrow ridges; gray to dark gray bark on older trees has obvious close interlacing shaggy-topped ridges.

SHAPE: Oval.

MATURE HEIGHT: 60-90 feet.

DECIDUOUS

FAMILY WALNUT

SHAGBARK HICKORY

Carya ovata



A slow-growing, native tree distributed throughout the state, known for its strong wood used for handles and cabinetry. The shagbark hickory is distinguished by its rough, shaggy bark, which peels in long, thick strips from trunks and branches. This slow-growing deciduous tree prefers deep, moist, well-drained soil and full to partial sun but displays excellent drought tolerance. Its nuts are relished by squirrels and can be eaten by people.

LEAF: Leaves are broad, up to 15 inches long, alternate, pinnately compound, and almost always have five finely-toothed leaflets with serrations on leaflet margins. Medium to dark yellow green in summer, faded green to chartreuse in fall but can also change to golden or brownish yellow.

TWIGS AND BUDS: Thick, stout reddish-brown or gray twigs, bold-textured jagged branch structure. Large terminal and lateral buds. Bud scales are persistent (some hickories lose their bud scales).

FRUIT OR SEED: The yellow-green fruit is composed of innermost sweet kernel, surrounded by hard bony shell with four subtle ribs and a thick outer husk which splits open into four quarters when ripe.

BARK: Young gray bark is smooth and striated but develops buckling ridges that separate from underlying bark to form long curly strips or plates.

SHAPE: Oblong crown, upright shape.

MATURE HEIGHT: 70-100 feet.

SHELLBARK HICKORY

Carya laciniosa



This slow-growing native tree is scattered throughout Ohio. Its heavy, dense, strong, yet elastic wood is sought after for making tool handles, athletic equipment, furniture, construction timbers, and firewood, and its wood chips are utilized in the smoking of meats. The nuts are relished by squirrels and give it an alternative common name of kingnut hickory. Shellbark hickory grows in moist soils, particularly along flood plains and bottomlands. This massive tree prefers deep, moist, rich soils under sunny conditions, is tolerant of summer drought, and is virtually problem-free.

LEAF: Alternate, pinnately compound, 1-2 feet long, almost always with seven to nine oblong, finely serrated leaflets. The number of leaflets is one good way to distinguish shellbark from shagbark hickory, which mostly has five leaflets. Medium to dark green with pale undersides in summer and faded green to yellow-brown in fall.

TWIGS AND BUDS: Twigs are stout, orange-brown, with orange lenticels, and prominently scarred with large terminal and lateral buds with numerous, persistent, brown scales.

FRUIT OR SEED: Fruit composed of sweet inner kernel surrounded by hard bony shell with four to six ribs, enclosed by a ½-inch thick woody outer elongated husk that splits into four quarters when ripe. Nut meat is sweet and relished by squirrels, deer, rabbits, foxes, turkey, and chipmunks.

BARK: Initially smooth and gray with flat, shallow interlacing ridges, later developing long, loose plates, resulting in a rough, shaggy appearance.

SHAPE: Narrow, oblong crown.

MATURE HEIGHT: 60-90 feet.

BIGTOOTH ASPEN

Populus grandidentata



This rapid-growing native tree is a pioneer invader of disturbed or cleared land. Its soft, light-colored wood is often harvested for pulpwood in the production of paper. Bigtooth aspen prefers moist, deep, rich soils of variable pH, but growth often occurs on gravelly, sandy, or clay soils that are nearly sterile, and prefers full sun to partial sun. Bigtooth aspen may become subject to the cankers, leaf spots, borers, caterpillars, and other pathogens and pests that affect members of the willow family.

LEAF: Alternate and ovate, 2-3 inches long and wide with long, flattened petioles, allowing them to easily ripple in the wind. As its common names implies, it features big teeth on the edges of its leaves. Fall color is varying shades of yellow, turning color all at once, with premature leaf drop starting in mid- to late-summer in drought.

TWIGS AND BUDS: Buds are fuzzy and reddish-brown, occurring on yellowish-gray twigs with prominent leaf scars.

FRUIT OR SEED: Short, cottony seeds mature in late spring to early summer.

BARK: With age, bark changes from thin, white-gray, and smooth with dark longitudinal fissures to white, creamy bark with large black horizontal bands, to furrowed and ridged, dark gray bark at the base of the trunk. Bark often has diamond-like pattern when young.

SHAPE: Pyramidal crown to spreading canopy.

MATURE HEIGHT: 60-70 feet.

BLACK WILLOW

Salix nigra



Black willow is the most common willow in Ohio. It has been planted extensively for stream bank stabilization and is found throughout the state, usually in wet areas or along streams. It is named for the black bark that is found on mature trunks. Its soft, lightweight wood was once used in the production of artificial limbs and is now used in wickerwork. Black willow grows in any type of soil and tolerates permanently wet sites. If planted on dry land, it prefers moist, poorly drained soils of variable pH. Willows were historically used as a source of salicylic acid, a key ingredient in the medicine aspirin, although now the chemical ingredient is biosynthesized. Black willow is susceptible to many insects and diseases, including crown gall, trunk sprouts,

cankers, and borers, but usually grows rapidly despite occasional minor setbacks.

LEAF: Alternate, light green, simple, pinnately veined, 3-6 inches long, thin, and finely serrated with a short petiole and a persistent stipule that encircles the stem. Fall color is light green or yellow-green before leaf drop.

TWIGS AND BUDS: Twigs are slender, smooth, brittle, drooping, bright reddish-brown to orange. Buds are small, covered by one bud scale with the terminal bud absent.

FRUIT OR SEED: Cone-shaped reddish-brown capsules appear in long hanging clusters and contain many small, cottony seeds, borne on catkins; capsules split at maturity to release seeds.

BARK: Thick, rough, blackish-brown, with scaly interlocking ridges and deep furrows.

SHAPE: Spreading, irregular.

MATURE HEIGHT: 60-85 feet.

EASTERN COTTONWOOD

Populus deltoides



Eastern cottonwood is a massive, rapid-growing poplar present throughout the state. It does best on moist, well drained soils but can also adapt to poor, dry soils and tolerates perpetual drought. This tree's dense mature bark is thick enough to survive forest fires with minimal outer bark loss. Its moderately light wood is used for pulpwood, blocking, and pallets. Eastern cottonwood has a host of pests and diseases that affect its health, but most trees grow with great vigor and do not have serious problems until they reach a large size, when lightning or wind begin to take their toll.

LEAF: Alternate, 3-7 inches long and 3-6 inches wide, roughly triangular with flattened base and a long, flat

petiole. Leaves are dark green in summer and fade throughout the autumn to poor shades of light green, yellow, and brown, often shriveling during drought periods in late summer and begin to drop prematurely before autumn arrives.

TWIGS AND BUDS: Twigs are stout and often angled with raised triangular-leaf scars. Buds are sticky or resinous.

FLOWER: Male and female flowers appear on separate trees. The large male flowers shed abundant amounts of pollen in early spring and can have bright gold, green, or red flowers.

FRUIT OR SEED: Fruit consists of green bud-shaped capsules clustered along short stems that hang from branches. Seeds are attached to a tuft of wispy cotton-like strands, resulting in the common name cottonwood. The cottony seeds are windblown and very noticeable, covering the ground like snow at their peak.

BARK: Smooth and greenish when young; dark brown-gray, heavily furrowed, and ridged with deep fissures when mature.

SHAPE: Broad and vase shaped.

MATURE HEIGHT: 80-110 feet

SWEETGUM

Liquidambar styraciflua



Found naturally only in southern Ohio, sweetgum is planted throughout the state as an ornamental shade tree prized for its rapid growth and brilliant fall color. Its common name comes from the taste of its hardened sap that bleeds from wounds on the tree. This tree can grow on a variety of sites, including wet areas, and adapts to poor soils of variable pH with full to partial sun.

LEAF: Star-shaped leaves are alternate, with five lobes (occasionally seven), and finely serrated leaf margins, with a shiny dark green color in summer and shades of red, yellow, orange, and purple in fall.

TWIGS AND BUDS: Twigs are tan-yellow to olive-brown their first year, with large, shiny, dark brown buds. Some twigs later develop a corkiness and winged character, primarily on the second-year gray twigs and branchlet while others are smooth and have no corky growth.

FRUIT OR SEED: A long-stalked, spiny, spherical, hard drooping brown fruit up to 1½ inch in size, first appearing as green orbs in summer, they persist for an extended period, falling off the tree throughout the autumn and into late winter. Seeds are eaten by birds, chipmunks, and squirrels.

BARK: Deeply ridged and furrowed with a gray-brown coloration when mature.

SHAPE: Pyramidal.

MATURE HEIGHT: 60-90 feet.

COLORADO BLUE SPRUCE

Picea pungens



Also known as blue spruce and Colorado spruce, this slow-growing conifer is native to the Rocky Mountains but has been planted as an ornamental evergreen throughout Ohio. Colorado blue spruce prefers full sun and moist, acidic soils that may be organic, sandy, or loamy; the soils cannot be poorly drained or wet. It can also adapt to tougher conditions including poor, clay, rocky, or dry soils of acidic, neutral, or alkaline pH and is tolerant of drought and urban pollution. Often planted as a popular landscape tree, Colorado blue spruce can be subject to leaf-related fungal diseases, spider mites, spruce gall aphids, and other pests and problems.

LEAF: Needles are up to 1¼ inch long, four-sided, sharp, and stiff, pointing outward from twigs and ranging in color from blue-green or blue-silver to green depending on the amount of wax covering needle surfaces.

TWIGS AND BUDS: Stout, hairless orange-brown twigs turn gray-brown with age. Buds are dark orange-brown and noticeably reflexed. Does not have drooping branchlets like Norway spruce.

FRUIT OR SEED: Cones are up to 4 inches long, cylindrical, shiny, and chestnut brown with distinctly flaky, thin, and flexible scales.

BARK: Relatively thin, scaly and pale gray when young becoming furrowed and gray to reddish-brown with age with scaly, shallow furrows and thin plates.

SHAPE: Upright and pyramidal.

MATURE HEIGHT: 50-75 feet.

NORWAY SPRUCE

Picea abies



Norway spruce is an evergreen conifer commonly planted throughout the state as an ornamental urban tree, windbreak, or snowbreak. As its name would suggest, this rapid-growing spruce is native to central and northern Europe and has many uses around the world including lumber, pulpwood, Christmas trees, and landscape specimen trees. Distinctive traits of this tree include the strong central leader, horizontal to upward sweeping side branches, and vertically hanging branchlets. The adaptable Norway spruce can persist in a variety of harsh soil and moisture conditions. Norway spruces support a variety of wildlife as a form of shelter and food, including deer, small game, hawks, owls, and songbirds.

LEAF: Evergreen needles, about 1 inch long, occur singly, spirally arranged on twigs, sharp-pointed, four-sided, and dark green. With age, the dense branchlets in the upper canopy of mature trees hang straight down for several feet and are called skirts.

TWIGS AND BUDS: Twigs are bright, golden-brown. Buds are egg-shaped, darker in color than the twigs.

FRUIT OR SEED: Cones are large, brown, up to 7 inches long with stiff scales, and distributed across the upper tree canopy, falling soon after releasing small seeds that are consumed by many birds.

BARK: Immature bark is relatively thin, reddish brown; mature bark is gray to brown, scaly, and often speckled with dried white resin that drips from bark blisters and pruned limbs.

SHAPE: Dense, conical.

MATURE HEIGHT: 60-100 feet.

EASTERN HEMLOCK

Tsuga canadensis



Eastern hemlock, also known as Canadian hemlock, is a popular landscape tree found in urban areas throughout the state. However, as a native tree, it is only found in the eastern half of Ohio, primarily in Appalachia. The scenic Hocking Hills and Mohican State Park areas are known for their stately hemlock trees. In the wild, it is a long-lived tree that thrives on the north slopes of hills or tucked into ravines, where there is more shade, cooler conditions, and more moisture in the acidic, well-drained soils of slopes. This native tree is prone to hemlock woolly adelgid infestation; this aphid-like insect is extremely destructive and difficult to control. Any sightings of hemlock woolly adelgid should be reported to the ODNR Division of Forestry at 1-877-247-8733.

LEAF: Evergreen needles measure about $\frac{3}{4}$ inch and occur singly, appearing on two rows of short, flattened glossy green needles on each side of its twigs. Needles occur on extremely short petioles, with blue-white undersides caused by microscopic pores appearing to merge as two solid white lines.

TWIGS AND BUDS: Twigs are slender, tough, and yellowish-brown to grayish-brown in color. Small buds are egg-shaped and reddish-brown.

FRUIT OR SEED: Cones are up to $\frac{3}{4}$ inch long, roughly oval, and hang singly from tips of twigs. Under each scale are two small, winged seeds; after cones mature and open to release their seeds, they may remain on the branches for several years.

BARK: Bark is flaky on young trees and gray-brown to red-brown; thick, fissured, and roughly ridged when older.

SHAPE: Upright pyramidal often with a drooping main stem at top (leader) and persistent dead lower branches.

MATURE HEIGHT: 80-120 feet.

AUSTRIAN PINE

Pinus nigra



This hardy pine is native to Europe, including Austria for which it is named, and was extensively planted in the Midwest since its introduction in the late 1700s. Austrian pine is known for its bold texture, fullness of foliage, and dark-green needles. Unfortunately, Austrian pine is prone to a number of insect and disease issues, including diplopedia tip blight, a disease which initially infests stems and needles at tips of branches and slowly kills trees over several years. This disease can wreak havoc in mass plantings as it spreads from a single infection to surrounding trees.

LEAF: Dark green needles occurring in two per bundle, usually 6 inches in length, stiff, thick, and will not break when bent; lasting four to eight years on stout twigs and branchlets.

TWIGS AND BUDS: Twigs are stout, brown to gray in color with a large white, oval-shaped terminal bud.

FRUIT OR SEED: Brown cones are oval shaped, 3 inches long and have small prickles on the backsides of the scales.

BARK: Immature bark is covered by a thick lower canopy of evergreen branches. Once sunlight hits the bark of the mature trees it takes on a checkered appearance. Furrows are darker brown to black and broad flattened ridges range from light gray to light brown to chalky white.

SHAPE: Spreading and open, usually flat-topped.

MATURE HEIGHT: 50-70 feet.

EASTERN WHITE PINE

Pinus strobus



This enormous, long-lived evergreen is widely planted throughout the state, although it is native only to north-east Ohio. The native conifer is logged for production of lumber and paper pulp. The eastern white pine is also planted and sold as a cut Christmas tree. White pines provide thermal cover for wildlife during winter, nesting sites for birds, and seeds for squirrels and birds. This tree prefers acidic, moist, well-drained soils and full sun, often intolerant of alkaline and poorly drained soils. As a result, the eastern white pine is susceptible to damage in urban settings and suffers from white pine blister rust as well as attacks from white pine weevils. This tree is susceptible to pine bark adelgid, particularly in overly dense plantations.

LEAF: Soft, thin blue-green needles 3-5 inches long occur in unique bundles of five. Needles remain on trees for 18 months, then turn yellow and drop in autumn.

TWIGS AND BUDS: Horizontal branching, thin, breakable brown-green twigs. Branches in whorls with each whorl representing a different year of growth.

FLOWER: Cylindrical yellow male flowers near branch tips fertilize light green females at ends of branches.

FRUIT OR SEED: 6-inch elongated cones are fully mature by summer.

BARK: Gray-green, smooth when young, then develops dark gray or brown ridges and furrows.

SHAPE: Irregular, pyramidal crown.

MATURE HEIGHT: 80-120 feet.

LOBLOLLY PINE

Pinus taeda



Loblolly pine is native to the southeastern U.S., where it is a major timber tree valued for its lumber and pulpwood but can be planted in warmer, southern Ohio. It may also be planted for an evergreen screen and for wildlife habitat. Loblolly pine grows best in moist, moderately-drained soils that are acidic and deep but can tolerate relatively dry and permanently moist soils, ranging from heavy clay to good topsoil. This medium-growing tree is somewhat susceptible to pine beetle but is highly tolerant of environment stresses such as height, drought, and clay or moist soils. Ohio plantations of loblolly pine are in the northernmost range of the species and can be affected by cold temperatures.

LEAF: Evergreen needles, 6-9 inches long, with (usually) three yellow-green needles per fascicle. Needles remain on twigs from two to four years.

TWIGS AND BUDS: Twigs are ridged, rough, fine to moderately stout with narrowly ovoid, light reddish-brown buds.

FLOWER: Monoecious; long, cylindrical, red to yellow male flowers emerge in clusters with new shoots in mid-spring to fertilize nearby yellow to purple female flowers.

FRUIT OR SEED: Oblong cones mature in early fall, and are 3-6 inches long, reddish-brown with sharp prickles on the backside of their scales. Seeds are released as pine scales open up and are eaten by wild turkeys, chipmunks, squirrels, and songbirds.

BARK: Initially scaly gray with orange-red interior bark, developing deep furrows topped with scaly plates or rounded ridges that are reddish-brown, gray-brown, or gray-black.

SHAPE: Rounded.

MATURE HEIGHT: 70-90 feet.

PITCH PINE

Pinus rigida



This pine is found primarily in southeastern Ohio, often growing on poor ridge sites with less fertile soils. Pitch pine grows slowly in full sun and is particularly fire resistant. Squirrels and birds commonly feed on its seeds, and its sprouts and seedlings are browsed by mice, rabbits, and deer. Pitch pine also provides cover and nesting sites for birds such as warblers, wild turkeys, and woodpeckers. In the past, it was a major source of pitch and timber for ship building, mine timbers, and railroad ties because the wood's high resin content preserves it from decay.

LEAF: 3 to 5 inches long, stiff, slightly curved evergreen needles, yellow-green to green in color with three twisted needles per fascicle.

TWIGS AND BUDS: Twigs are stout and orange-brown in color. Buds are narrow and ovoid. Epicormic shoots are common on the bole.

FRUIT OR SEED: Cones are oval shaped, 2 to 4 inches long, light brown in color, and usually have scales tipped with sharp spines. Cones mature in fall after two seasons and can persist on trees for many years.

BARK: Dark and scaly when young, developing red-brown or yellow-brown thick flat plates and deep furrows with age.

SHAPE: Variable, can be straight or irregular.

MATURE HEIGHT: 40-70 feet.

RED PINE

Pinus resinosa



Red pine is native to New England and the upper Midwest, but it was planted extensively throughout Ohio for reforestation and its lumber and pulpwood. Although it is native to North America, it is also known as Norway pine because early settlers of New England mistook it for Norway spruce, and also because it grew abundantly near Norway, Maine. Red pine is susceptible to some insect and disease issues, including diplopedia tip blight, a disease which initially infests stems and needles at tips of branches and slowly kills trees.

LEAF: 4-6 inches long needles in fascicles of two, dark yellow-green, and will break easily when bent. Needles persist for up to four years.

TWIGS AND BUDS: Twigs are orange-brown and lustrous. Buds are covered with thin and ragged orange-brown scales that are often grayish on the margin. Winter buds are resinous.

FRUIT OR SEED: Cones are less than 3 inches long, sessile, chestnut brown in color, rounded, and unarmed. Seeds have wings that are up to $\frac{3}{4}$ inch long.

BARK: Bark on young trees is flaky and orange-red, eventually breaking up into large, flat, reddish brown, superficially scaly plates that are irregularly diamond shaped.

SHAPE: Upright oval to symmetrical.

MATURE HEIGHT: 50-80 feet.

SCOTCH PINE

Pinus sylvestris



This evergreen conifer is native to northern Europe and Asia, including Scotland for which it is named. Also known as Scots pine, it is commonly found in Ohio in urban and rural areas as an ornamental and windbreak tree. Scotch pine is widely used as a Christmas tree because of its excellent form and ability to hold its needles for extended periods of time. Scotch pine does best in well-drained soils of acidic pH with full sun, but is known for its tolerance of poor soils that may be sandy, rocky, or of heavy clay, and of acidic, neutral, or alkaline pH. It is vulnerable to diplodia tip blight, pine wilt fungus, and nematodes but is tolerant of environmental stresses including heat, drought, sterile soils, and severe cold.

LEAF: Evergreen blue-green to yellow-green needles, up to 3 inches long, with two stout twisted needles per fascicle, generally remaining on twigs for two to four years.

TWIGS AND BUDS: Twigs are moderately stout, green when young, and change from yellow-brown to olive-brown with large orangish, narrowly oval-shaped buds.

FRUIT OR SEED: Dry, small oval-shaped brown cones, 1-3 inches long, slightly stalked without prickles on the backs of their scales and mature in fall. Seeds are consumed by many mammals and birds.

BARK: Orange to orange-brown and scaly or peeling when young; later developing irregular gray or reddish-brown ridges and furrows. Upper trunks show orange peeling bark while lower trunk bark is composed of gray or reddish-brown fissures and plates.

SHAPE: Irregular and contorted.

MATURE HEIGHT: 50-60 feet.

SHORTLEAF PINE

Pinus echinata



One of the southern yellow pines, shortleaf pine is native to the southeastern U.S. and found primarily in southeast Ohio in dry, rocky soils. This large, slow-growing conifer is known for its drought tolerance, open pyramidal crown, and unique ability of young trees to sprout following fire. Shortleaf pine provides cover and nesting sites for birds and its seeds are eaten by wild turkeys, squirrels, and birds. Its hard, heavy wood is used for construction, pulpwood, and millwork. Apart from southern pine beetles and weevils, shortleaf pine is relatively healthy with few problems.

LEAF: Evergreen needles, dark yellow-green in color, 3-5 inches long, slender and flexible with two or three needles per fascicle.

TWIGS AND BUDS: Twigs are green and purple when young, later turning red-brown.

FRUIT OR SEED: Cones are oval shaped, short-stalked, 1-3 inches long, and armed with a short spine at the tip of each scale.

BARK: Bark is thick, reddish-brown, broken into large, irregular, scaly plates. May develop small resin pockets.

SHAPE: Small open pyramidal crown, usually a medium to large tree with a straight trunk.

MATURE HEIGHT: 40-70 feet.

VIRGINIA PINE

Pinus virginiana



Virginia pine is an evergreen conifer commonly found in southeastern Ohio on unglaciated soils and rocky outcrops. This native tree could be used as pulpwood. Its seeds are eaten by wild turkeys, songbirds, and squirrels. Virginia pine grows where few other trees will grow and can provide a valuable cover for barren hillsides, strip-mined areas, infertile farmlands, and abandoned fields. It is often found in well-drained acidic or neutral soils, thriving on neglect and drought in full sun. This pine is known by several common names including scrub and poverty pine.

LEAF: Short, twisted needles, less than 3 inches long, are yellowish green and occur in bundles of two. Needles are divergent and often make a V shape. Needles are stout and remain on the tree for three to four years.

TWIGS AND BUDS: Twigs are slender and purplish with a waxy coating; buds are gray-brown and narrowly ovoid.

FRUIT OR SEED: Cones are about 2 inches long, dark, reddish-brown, oval shaped, and lustrous with sharp prickles on the backside of their scales.

BARK: Thin and relatively smooth young bark becomes very scaly or plated with age, and has a reddish-brown color. It does not have the orange bark on its upper limbs that is typical of Scotch pine, the other common pine with two twisted needles per bundle.

SHAPE: Irregular and contorted.

MATURE HEIGHT: 35-65 feet.

EASTERN REDCEDAR

Juniperus virginiana



The eastern redcedar is the most common evergreen conifer found in Ohio, though it predominates in southwestern counties where soils are more alkaline. Eastern redcedar is a pioneer invader, often found in pastured fields or woods. This native evergreen creates an excellent windbreak and serves as an erosion control shrub in nature. Its aromatic heartwood was historically used for making cedar chests, closet wood lining, small carvings, pencils, and fence posts.

LEAF: Immature foliage is needlelike and pointed; mature leaves are scale-like and untoothed. Immature needles are prickly to the touch when handled.

TWIGS AND BUDS: Twigs are green, angular, and abundantly branched in various directions.

FRUIT OR SEED: Female fruits are small, spherical and irregularly-shaped cones resembling berries. Mature cones are berry-like and bluish in color. Mature fruit serves as a food source for wildlife.

BARK: Thin, reddish-brown, fibrous, and shreds into long strips.

SHAPE: Dense pyramid.

MATURE HEIGHT: 30-50 feet.

CALLERY PEAR

Pyrus calleryana



This medium-sized deciduous tree is native to Southeast Asia and was planted throughout the state as an ornamental, urban tree. Formerly one of the most popular decorative trees in Ohio, callery pear is now considered invasive after trees began reproducing and spreading uncontrollably. Selective breeding produced cultivars including the Bradford pear, which is commonly available but is being phased out due to its ability to cross-pollinate. Its fruits are consumed by birds which spread seeds to abandoned fields, roadsides, forests, and wetlands. Callery pears leave slippery messes after their flowers and fruits drop, and can become dangerous. These trees also have weak wood and a narrow branch structure, making it extremely susceptible to breakage. Callery

pear should not be planted in Ohio due to its ability to rapidly spread and displace native trees.

LEAF: Alternate, simple, heart-shaped to ovate with finely serrated margins, 2 to 3 inches in length. Shiny green surface with paler undersides. Brilliant fall color ranging from red, orange, and purple.

TWIGS AND BUDS: Twigs are glossy brown to reddish brown; terminal buds are large (up to ½ inch long), ovate, and covered in light brown wooly hairs.

FLOWER: Flowers are small, five-petaled, white, showy and appear abundantly in early spring before leaves emerge. Flowers have an unpleasant smell.

FRUIT OR SEED: Small, brown, round, bitter fruit is hard and contains tiny seeds; fruits are consumed by birds who disperse seeds through their droppings.

BARK: At first smooth with numerous lenticels, light brown to reddish brown then grayish brown, shallowly furrowed and ridged with age.

SHAPE: Upright.

MATURE HEIGHT: 50-60 feet.

INVASIVE

FAMILY BEECH

SAWTOOTH OAK

Quercus acutissima



This rapid-growing deciduous tree, native to Japan, China, and Korea, is often planted as a wildlife food source for its heavy acorn production at an early age. Large birds (crows, blue jays, wild turkeys), squirrels, deer, raccoons, opossums, and other mammals enjoy the large crops of acorns, which are borne heavily every other year, if not every year. Unfortunately, sawtooth oak has been found to invade natural areas and displace native species, and should not be planted.

Sawtooth oak is easy to identify by its pyramidal shape in youth, striated young bark, retained winter foliage, acorns with frilled caps, and finely serrated leaves (from which it gets its common name). It prefers full to partial

sun and moist, well-drained, acidic soils of moderate fertility but adapts well to relatively poor, dry soils of neutral or slightly alkaline pH and is basically problem-free.

LEAF: Alternate, simple, glossy, oblong, 3-7 inches long, non-lobed leaves are finely serrated with a bristle tip. Leaves resemble American chestnut leaves. Fall color is yellow to brown and appears late. Most leaves remain on trees throughout the winter and abscise the following spring before bud break.

TWIGS AND BUDS: Slender, red to gray-brown twigs terminate in a cluster of checkered buds.

FRUIT OR SEED: Oval acorns are covered halfway with a unique frilled cap composed of long reflexed scales; ripen after two years and fall in late summer to early autumn. Nuts are consumed by wildlife while the cap falls away and persists on the ground into the following year.

BARK: Ragged, ridged, furrowed, dark gray to gray-brown.

SHAPE: Pyramidal.

MATURE HEIGHT: 40-60 feet.

SIBERIAN ELM

Ulmus pumila



This deciduous tree is native to eastern Asia and has been planted extensively since being introduced to the U.S. in the 1860s in urban areas as windbreaks. It is known for its hardiness, fast growth, and ability to grow in various moisture conditions. Unfortunately, Siberian elm can be invasive and spread rapidly. Siberian elm is extremely drought and cold resistant, growing well in poor sites where other trees cannot. It forms dense thickets that close open areas and displace native vegetation, reducing forage for wildlife and livestock. Though Siberian elm is still sold commercially, it should not be planted because it is invasive.

LEAF: Alternate, simple, elliptical to ovate in shape, measuring up to 2½ inches long with singly serrated margins and nearly equilateral base. Dark green and smooth above with paler green undersides.

TWIGS AND BUDS: Slender, zigzag, silvery grayish-green in color. Small buds are reddish-gray in color.

FRUIT OR SEED: Thin, nearly rounded wafer-like winged fruit that is notched at top, initially pale green and later turning light brown when ripe in spring. The wings on the fruit aid in seed dispersal by wind.

BARK: Irregularly furrowed, ridged, light grayish brown, often streaked with lighter stains caused by slime flux (a bacterial disease also called wet wood).

SHAPE: Round.

MATURE HEIGHT: 50-70 feet.

INVASIVE

FAMILY QUASSIA

TREE-OF-HEAVEN

Ailanthus altissima



Tree-of-heaven, or ailanthus, is a highly invasive deciduous tree native to China introduced to the U.S. in the late 1700s. Its name refers to its ability reach enormous heights under optimum conditions. This fast-growing tree is often found in urban areas and thrives in disturbed or neglected sites. Mature trees can produce over 300,000 wind-dispersed seeds per year and can vigorously sprout, allowing it to colonize disturbed sites in Ohio woodlands and suppress native tree growth. Tree-of-heaven can quickly displace native vegetation and produces toxins to inhibit growth of nearby plants.

LEAF: The largest pinnately compound leaves of any tree found in Ohio. Alternate leaves emerge bronzed in

spring and quickly transition from medium to dark green as they expand up to 2 feet in length with 11 to 41 leaflets (always an odd number). Crushed leaves and stems emit an unpleasant odor (sometimes likened to burnt peanut butter) and fall color is essentially non-existent.

TWIGS AND BUDS: Twigs are stout and olive-tan color in winter, with huge leaf scars and very small buds, with no true terminal bud. When crushed, they emit a slightly foul odor.

FLOWER: Long, thin, green-white dioecious flowers emerge on separate trees in late spring.

FRUIT OR SEED: Composed of many individual winged fruits that change from light green, yellow, orange, or red in summer to beige in color by early winter and remain on the female trees until early spring.

BARK: Bark remains fairly smooth as twigs become branches, taking on a subtle diamond-like pattern. Ridges and furrows are slow to appear on light gray mature bark.

SHAPE: Upright.

MATURE HEIGHT: 80 feet.

WHITE MULBERRY

Morus alba



This fast-growing tree is native to China and was introduced in the 1700s as a food source for silkworms. White mulberry is similar to the native red mulberry but may be distinguished by the leaves. White mulberry leaves have glossy surfaces whereas the red mulberry leaves do not. White mulberry is found throughout the state, where it invades old fields, urban lots, roadsides, forest edges, and other disturbed areas. It is adaptable to many soil types and pHs but prefers moist or dry conditions; it is also pollution and drought tolerant. It poses an ecological threat by displacing native species, possibly hybridizing with and transmitting a root disease to the native red mulberry.

LEAF: Alternate, simple, 3-6 inches long, serrated, irregularly lobed, dark green, shiny and smooth above. Leaves are polymorphic, meaning multiple leaf shapes with various lobing can be found on the same branch.

TWIGS AND BUDS: Slender, zigzag, tan, smooth, with prominent winter buds.

FRUIT OR SEED: Berries are variably colored from creamy-white to dark red, resembling blackberries and containing tightly packed seeds that mature in the summer. They are quickly eaten by birds, squirrels, and other mammals.

BARK: Golden-brown bark becomes lightly fissured, eventually forming long, flat ridges and narrow, yellow fissures on mature bark.

SHAPE: Open and gangly.

MATURE HEIGHT: 30-60 feet.

GLOSSARY

alternate—only one bud or leaf found at each node

asymmetrical—uneven or unequal

blade—the broad or expanded part of the leaf

branching—*opposite*: occurs directly across from each other on both sides

alternate: occurs in a zigzag pattern along the branch but never directly across

broadleaf—usually deciduous hardwood tree, as opposed to conifer

bristle tip—a small hair on the pointed tips of leaves (such as red oaks)

bud—a structure containing dormant, beginning leaf or flower tissue

bud scales—protective, often overlapping structures, which cover dormant plant tissue

bundle scars—small mark inside the leaf scar indicating where the leaf vein connected to the stem

catkins—elongated, cylindrical flower cluster that usually lacks petals and is drooping, usually indicates unisex flowers

chambered—containing hollow opening

compound—having multiple leaflets on a common stalk

conifer—evergreen, cone-bearing trees

crenate—leaf shape having a round-toothed shape

drupe—fleshy fruit with a thin skin that develops around a central seed (such as cherries, plums, olives)

diaphragmed—partitioned by membranous structures

fascicle—bundle of conducting vessels

fruit—the seed-bearing organ of a plant, such as a nut, berry, and pome

globular—spherical in shape

husk—dry outer covering of fruits or seeds (such as walnuts and hickories)

lance shaped—narrow and tapering toward the tip

leaf-scar—mark left on twig where leaf was attached

leaflet—one of the blades or divisions of a compound leaf

lobed—divided rather deeply

margin—leaf edge

midrib—central or middle vein on a leaf

needle—a needle-shaped leaf such as a pine needle

node—place on twig that bears one or more leaves

opposite—two leaves found at each node

ovate—leaf or leaflet is widest below the middle (that is, closer to the top of the petiole)

palmate—with multiple leaflets, arranged in a pattern that resembles fingers radiating from a hand

parallel—veins that extend in the same direction and do not cross

petiole—stem supporting a leaf with a single blade

pinnate—with multiple leaflets, arranged in a pattern that resembles a feather, leaflets are attached to a central axis or rachis

pith—center of stem or twig; often soft or spongy

pubescent—covered with short soft hairs

rachis—the central stem of a compound leaf to which leaflets are attached

serrate—toothed or notched on the leaf edge

simple—having one leaf blade

sinus—rounded depression between lobes

spur—a short stout branchlet

stipules—leaflike structure found at the base of a leaf petiole

symmetrical—even or equal on opposite side

thorn—a sharp pointed outgrowth on a plant

twig—a small outgrowth on a stem

valvate—petals or leaves that have adjacent edges but do not overlap

veins—tissue that forms the framework of a leaf

whorled—three or more leaves or buds present at each node

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PHOTO CREDITS

The ODNR Division of Forestry has provided images for this booklet.

ForestryImages.com: · Pg. 9, American Chestnut (nut) by USDA Forest Service, SRS, Bugwood.org · · Pg. 12, Chestnut Oak (nut) by Keith Kanoti · · Pg. 12, Chestnut Oak (leaf), Pg. 33, Yellow Buckeye by Wendy VanDyk Evans · · Pg. 33, Yellow Buckeye (leaf), Pg. 37, Yellow Poplar (leaf, bark), Pg. 36, Cucumbertree (bud), Pg. 53, Pignut Hickory (leaf), Pg. 43, Red Mulberry (leaf), Pg. 52, Mockernut Hickory (leaf, bark) by Chris Evans · · Pg. 17, Shingle Oak (leaf), Pg. 45, White Ash (bud), Pg. 44, Green Ash (bud), Pg. 57, Black Willow (leaf) by Paul Wray · · Pg. 21, Black Locust (thorns), Pg. 50, Black Walnut (bud) by Rob Routledge · · Pg. 37, Yellow Poplar (tree), Pg. 52, Mockernut Hickory (nut), Pg. 53, Pignut Hickory (tree) by John Ruter · · Pg. 76, White Mulberry (tree, bark), Pg. 48, Blackgum (fruit, tree), Pg. 51, Bitternut Hickory (bud), Pg. 32, Ohio Buckeye (tree) by T. Davis Sydnor · · Pg. 43, Red Mulberry (fruit), Pg. 52, Mockernut Hickory (bud, tree), Pg. 55, Shellbark Hickory (bark), Pg. 53, Pignut Hickory (bark) by Vern Wilkins · · Pg. 72, Callery Pear (flower) by Leslie J. Mehrhoff · Pg. 57, Black Willow (bark) by David Stephens · · Pg. 14, Northern Red Oak (bark) by Becca MacDonald · ·Pg. 57, Black Willow (tree) by Steven Katovich · · Pg. 53, Pignut Hickory (nut) by Rebekah D. Wallace · · Pg. 74, Siberian Elm (flower, tree) by Tom DeGomez · · Pg. 74, Siberian Elm (bark) by John M. Randall · · Pg. 72, Callery Pear (leaf, bark) by Chuck Bargeron · · Pg. 72, Callery Pear (tree) by Dan Tenaglia · · Pg. 76, White Mulberry (fruit) by Ohio State Weed Lab · · Pg. 74, Siberian Elm (leaf) by Steve Dewey · · Pg. 60, Colorado Blue Spruce (leaf, tree), Pg. 66, Pitch Pine (bark, cone), Pg. 69, Shortleaf Pine (leaf, tree, cone, bark), Pg. 67, Red Pine (bark, cone), Pg. 61, Norway Spruce (leaf), Pg. 62, Eastern Hemlock (bud) by ForestryImages.com

WEBSITES

Ohio DNR Division of Forestry, Common Ohio Trees - forestry.ohiodnr.gov/trees

U.S. Department of Agriculture Fact Sheets - plants.usda.gov/java/factSheet

Virginia Tech Dendrology - dendro.cnre.vt.edu

Arbor Day Foundation - arborday.org/trees

Morton Arboretum - mortonarb.org

SUGGESTED PHONE APPS

vTree app, Virginia Tech Dendro – Available on both Android and iTunes Store

Great Lakes Early Detection Network (GLEDN) app – Available on both Android and iTunes Store

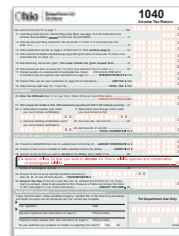


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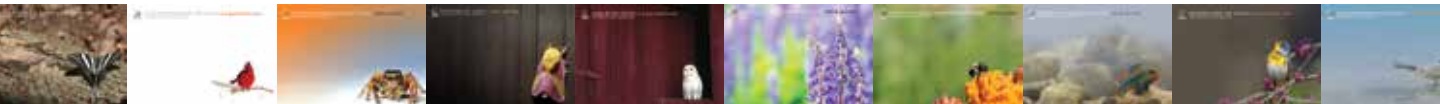
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WHITE PINECONE
BY NINA HARFMAN