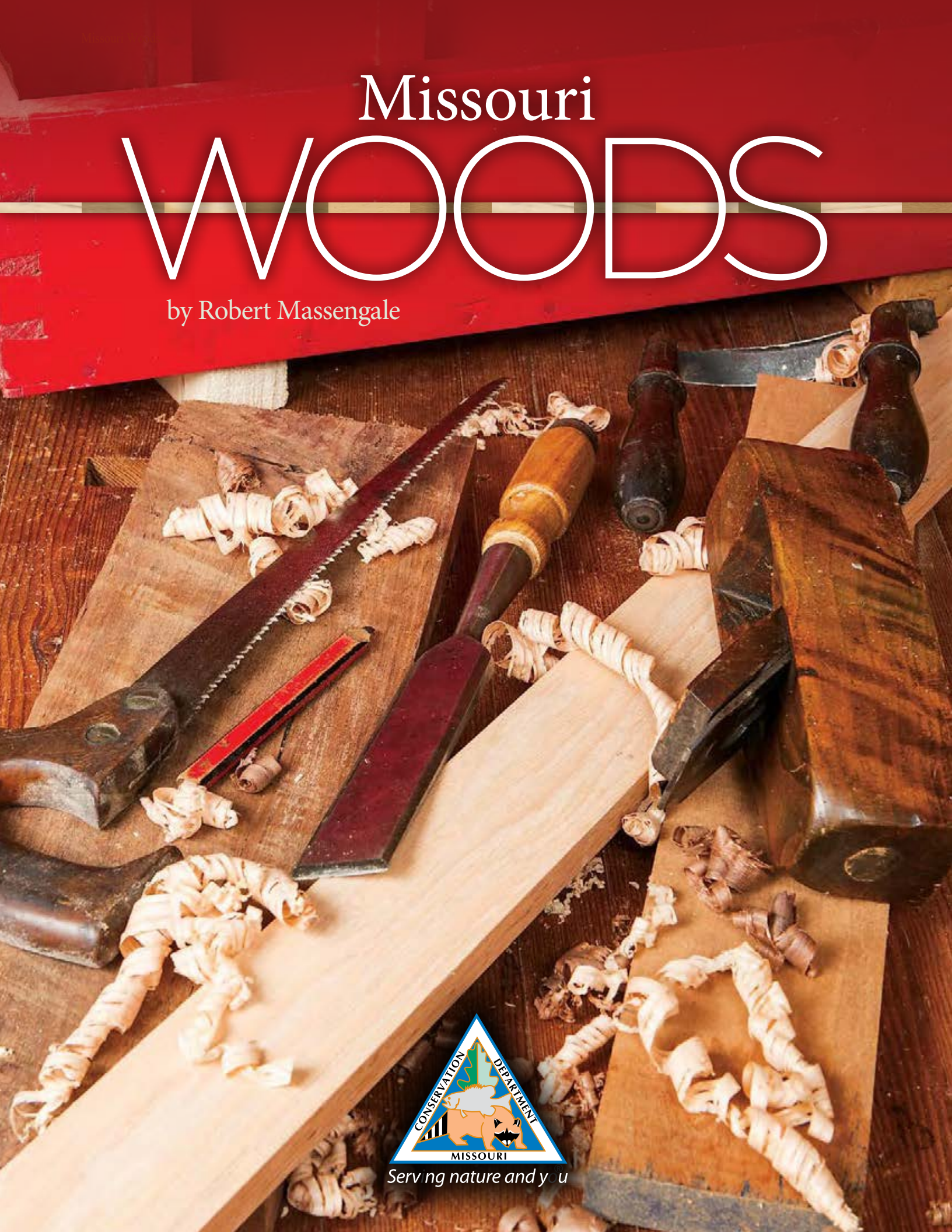
Missouri WOODS

by Robert Massengale



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Red cedar face grain, American holly face and end grain, butternut face and end grain, Kentucky coffee tree face grain, and river birch face and end grain photographs by Eric Meier, www.wood-database.com

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Published by the Missouri Department of Conservation
PO Box 180, Jefferson City, MO 65102-0180

mdc.mo.gov

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Cliff White

Introduction

Missouri is located on the western edge of the central hardwood region of the United States. As a result, it has many species of trees native to that region as well as a few northern and southern species, too. Most of the timber in Missouri is in the southeastern one-third of the state. While oak and hickory are predominant species on the uplands, cottonwood, elm, and soft maple are the major bottomland species. Short-leaf pine is the only native pine in the state.

When Missouri was settled, forests occupied an estimated 30 million acres. In 2014, approximately one-third of the state, or 15.4 million acres, were forested. Private landowners own approximately 82 percent of Missouri's forestlands.

Much land north of the Missouri River, with the exception of steep river hills, is under cultivation. The forests of this area are generally more scattered and in smaller blocks and strips. Some of the highest quality walnut, white oak, and soft maple are found in this area. South of the river, the oak-hickory forests predominate with a scattering of pine in the south central and eastern Ozarks.

This publication has been prepared to help identify the major commercial wood species, or species groups, native to the state. It does not deal with the many smaller trees and shrubs, which are not generally harvested for commercial purposes. Several groups, such as the elms, hickories, and oaks, are lumped together because no separation is made by the industry. Indeed, in many cases it is not possible to separate the woods without laboratory equipment or botanical materials from the tree. Other references are available to assist in exact identification of species if you are interested. Several species are included which have only limited markets, but will occasionally be found on a log deck at a sawmill, and which you may want to correctly identify. The red and black oaks as well as white oaks are lumped together in groups, as is the practice in the lumber industry.

The woods are listed in alphabetical order according to their common or popular names. Along with the common name is listed the scientific (Latin) name of the species, or of the most common species in a group. Some industries are quite selective when it comes to timber species. An example of this would be the white oak whiskey barrel industry, which probably uses 95 percent white oak (*Quercus alba*), simply because many other white oak species are just not satisfactory for barrel manufacturing. Otherwise, the red and black oaks are generally lumped together in the trade and cannot be distinguished from each other in use.

Wood Identification

Wood is the oldest material used by humankind and yet is also one of the most modern. Even with new materials being developed through science, wood still serves uncounted needs and will continue to do so. A basic ability to recognize different wood types will add to your enjoyment and use of woods. The purpose of this book is to point out simple differences that separate the common species in Missouri.

Throughout the species descriptions, I will mention several criteria useful for identification, such as the range of the tree in the state, its general habitat and associated species, and sometimes the general size or shape of the tree. The bark is generally described as an additional feature used for identification. Also noted are the colors of sapwood and heartwood, characteristics of the wood relevant to its use, its durability if significant, and descriptions of the growth rings and cell arrangement. Mention is also made of some of the past and present common uses of the wood as well as comments about its desirability as a raw material for use in home workshops.

Wood is an organic material composed of cells. The cells are elongated, hollow, and generally oriented either up and down the tree length, or from the center of the tree out to the bark. Because of these orientations, woods are best studied in one or more planes (see illustration). The most common plane is the cross-section ***(end grain)***, or the view of the stump or trunk, as the tree is felled. This is also how the growth or annual rings are most easily seen. The radial plane ***(face grain)***, or the view from the center of the tree out to the bark, may also be helpful. The ray tissue is apparent on this plane. Rays may be wide or narrow and provide a distinctive fleck in some woods that can be a good identifying characteristic. While less useful in identifying a wood, the tangential plane ***(edge grain)*** exhibits the grain of the wood, as it is the view tangential to the growth rings of the tree.

Even though most cells are microscopic, many can be seen by the naked eye on the cross-section of a piece of wood. Their details of arrangement can frequently be seen with the help of a sharp pocket

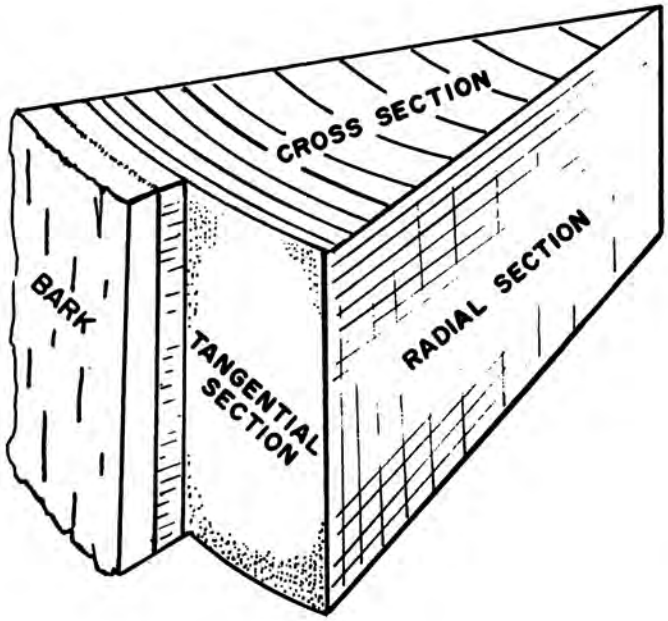


*Fig. 1: Woods are studied from the cross-section (**end grain**), the radial section (**face grain**), or the tangential section (**edge grain**) of a tree. On the cross-section, cell arrangement, size, and location are the best guides to identifying many woods. The rays on the radial section can also be a good identifying characteristic.*

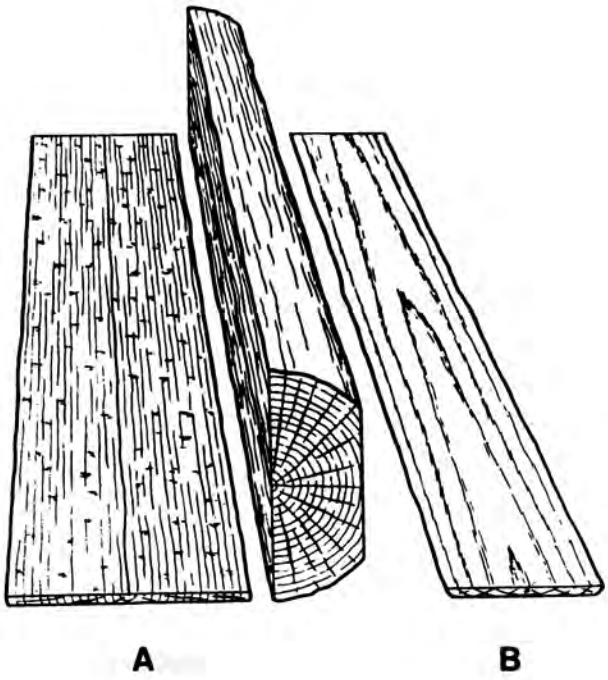


Fig. 2: Lumber can be cut from a log in two distinct ways: radially to the rings, producing "quarter-sawn" lumber (A), and tangential to the annual rings, producing "plain-sawn" lumber (B). (Courtesy Wood Handbook, *USDA Agricultural Handbook, USFPL, U.S. Forest Service.)*

knife or razor blade and a 10-power hand lens. Cell arrangement, size, and location as seen on a cross-section are the best guides to separating most common woods. The cells, of which there are many types, combine to become tissues, and these tissues become wood as we observe it. Cells and tissues are both useful in identifying woods.

Throughout the species descriptions, I have mentioned several criteria useful for identification. You will note the mention of a substance called "tylosis" in some woods. Tylosis is a clear, plastic-like material that appears in pores and cells and blocks the flow of liquids. It appears infrequently enough to be a useful identifying feature.

Hardwoods and Softwoods

Everyone has heard the terms "hardwood" and "softwood." Botanically, the hardwoods are Angiosperms, or the species classified as broadleaved trees. Softwoods, then, are Gymnosperms, the species classified as conifers, which are usually cone-bearing trees. It is important to remember, however, that the term hardwood or softwood is not a reliable guide to the wood itself. The hardwoods, with a few exceptions, lose their leaves in the fall or during the winter. Softwoods generally have needle-like leaves that remain on the tree throughout the year. There are only four softwoods native to Missouri, although many other species have been planted.

Each of our native species is different enough to have identifying characteristics to distinguish it from all others. It will be most helpful, as you begin, to determine first of all if the wood you wish to identify is a native species. Your source of the wood or other factors will help you decide this. Leaves, bark, or the fruit will also be useful to you if they are available.

All trees that grow in Missouri exhibit annual (or growth) rings, though some are more distinct than others. Cells and growth rings are most clearly seen on the cross-section of the wood if clean cut with a sharp knife, and the use of a hand lens will help distinguish the wood's characteristics.

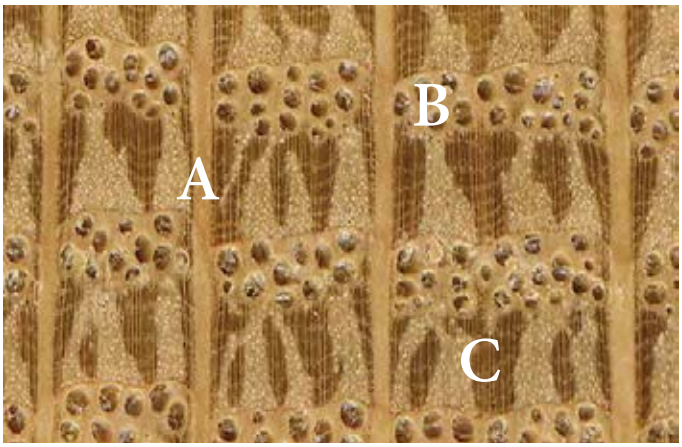


Fig. 3: This magnification of a cross-section of white oak clearly shows the linear wood rays (A), the large springwood pores (B), and the finer summerwood pores (C). Annual rings, formed by the springwood pores, are clearly shown.

Annual growth rings may, in some cases, be good identifying features. Growth rings are generally divided into springwood (early wood) and summerwood (late wood), although it may not be readily apparent where one ends and the other begins. Springwood consists of the larger cells produced first in the spring, while summerwood (the later and smaller cells) follows until the tree becomes dormant in the fall. In some softwoods, there appear to be color differences between springwood and summerwood. This is because the transition from springwood to summerwood is abrupt. Other species have no apparent color difference and have a gradual transition.

Another identifying characteristic is pores. Hardwoods have them, softwoods do not. Pores are the large cells in hardwoods that transport water and dissolved materials. Often the pores will be quite large in the springwood area and decrease either abruptly or gradually in size into the summerwood. The abrupt transition from large thin-walled pores in the springwood to smaller thick-walled cells in the summerwood is often clearly seen, and this feature defines the wood as being "ring porous." Oak is a good example of a ring-porous wood. On the other hand, if the large pores are dispersed evenly throughout both the springwood and summerwood, the wood is then defined as being "diffuse porous," even though you may clearly see the annual rings — a good example of this is maple.

Color and odor can also be used to identify common woods in Missouri. Black walnut, for example, has a distinct color unlike other native woods. Sassafras has a unique spicy fragrance that quickly identifies it. Odor and color should be used with some caution however. Odor tends to fade over time and one needs to be familiar with the odor before attempting to identify the wood in question. Color also changes over time and may vary between boards, between sapwood and heartwood, and after extended exposure to sunlight. Sometimes only a fresh cut on the wood will expose the true odor and color. Generally speaking, the sapwood or outer portion of the tree has no distinct odor. Heartwood usually has the characteristic odor and color, which may be useful in identification.

Texture and grain, weight, and hardness are helpful identifiers, but may be more useful if you have other samples of woods, either known or unknown, to compare with. However, these characteristics will be consistent in the species and knowing the features for a particular species may be helpful to you.

All of the identifying features mentioned for each of the species should be used together in determining which wood you have, because there are enough variations between trees and sites to make identification by one feature alone somewhat limiting. Two, three, or even four matching characteristics will give you a more accurate guide.

The weight of wood is affected primarily by two factors: the density (measured as specific gravity) and the moisture content (usually expressed as a percent of oven dry weight of the wood). The specific gravity of a wood is the ratio of the density of the wood to the density of water at a specified temperature (usually 4 degrees Celsius). Because the moisture in wood varies, specific gravity is usually based on the oven dry weight.

The moisture content of different woods varies greatly and will even vary between trees of the same species and between different parts of the same tree. When both the cell walls and the cell cavities in wood contain moisture, the wood is said to be "green." At the point where no moisture is left in the cell cavity, the wood is said to be at the fiber saturation point. This is also approximately the air-dried condition for wood, although when wood is left outdoors for a considerable length of time, it will frequently dry to 15 percent moisture content or below.

Wood is dried below the fiber saturation point through the use of a dry kiln. Most hardwoods destined for furniture, flooring, or other interior uses are usually dried to 6 to 8 percent moisture content. Kiln-dried wood must be stored indoors to keep it from absorbing moisture.

The following pages list each Missouri species alphabetically and cover softwoods before hardwoods.

Being able to identify woods is a useful art that should add to your pleasure and appreciation in using and enjoying woods. Missouri has woods of many types that will not only stir your interest, but also challenge your ability to determine their true identity.

Table 1 — Comparative Statistics for Missouri Woods

The following data will be helpful in separating different woods if you are familiar with another wood as a reference point. In some cases, these are "relative" values, as a wood may vary due to the site where it grows.

Species (Common Name)	(1) Specific Gravity (%)	(2) Weight/Cubic foot (Lbs.)	(3) Relative Hardness
Ash	.54	41	M
Basswood	.32	26	S
Beech	.56	45	MH
Black Cherry	.47	35	M
Black Gum	.46	35	M
Black Locust	.66	48	H
Black Walnut	.51	39	MH
Black Willow	.34	26	S
Box Elder	.45	34	S
Buckeye	.33	25	M
Butternut	.36	27	S
Catalpa	.38	29	S
Cottonwood	.37	28	S
Cypress, Bald	.42	32	S
Dogwood	.64	51	H
Elm, American	.46	36	M
Elm, Slippery	.48	37	M
Hackberry	.49	37	M
Hickory	.65	51	H
Holly, American	.50	40	MH
Honey Locust	.60	44	VH
Kentucky Coffee Tree	.50	37	H
Maple, Hard	.57	44	H
Maple, Soft	.44	33	M
Mulberry	.59	46	H
Osage Orange	.76	58	VH
Pecan	.60	47	H
Persimmon	.66	51	VH
Oak, Red	.56	44	H
Oak, White	.59	47	H
Red Cedar	.44	33	M
River Birch	.50	40	M
Sassafras	.45	34	M
Short-leaf Pine	.50	36	H
Sweet Gum	.44	34	M
Sycamore	.46	35	M
Tulip Tree	.38	28	M
Water Tupelo	.48	35	M

(1) Green volume and ovendry weight (Data from U.S. Forest Products Lab).
(2) At 12 percent moisture content (Data from U.S. Forest Products Lab).
(3) The range of hardness may be: Very Hard (VH), Hard (H), Medium Hard (MH), Medium (M), Medium Soft (MS), or Soft (S).

Softwoods

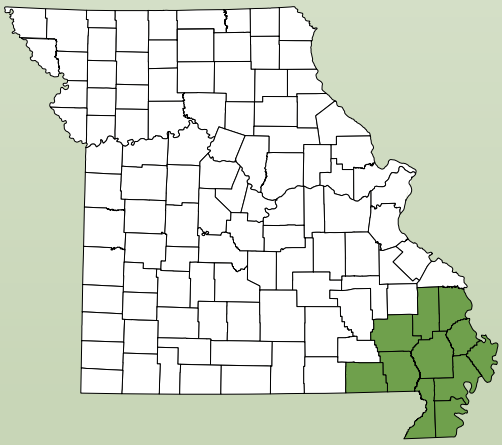
David Stonner

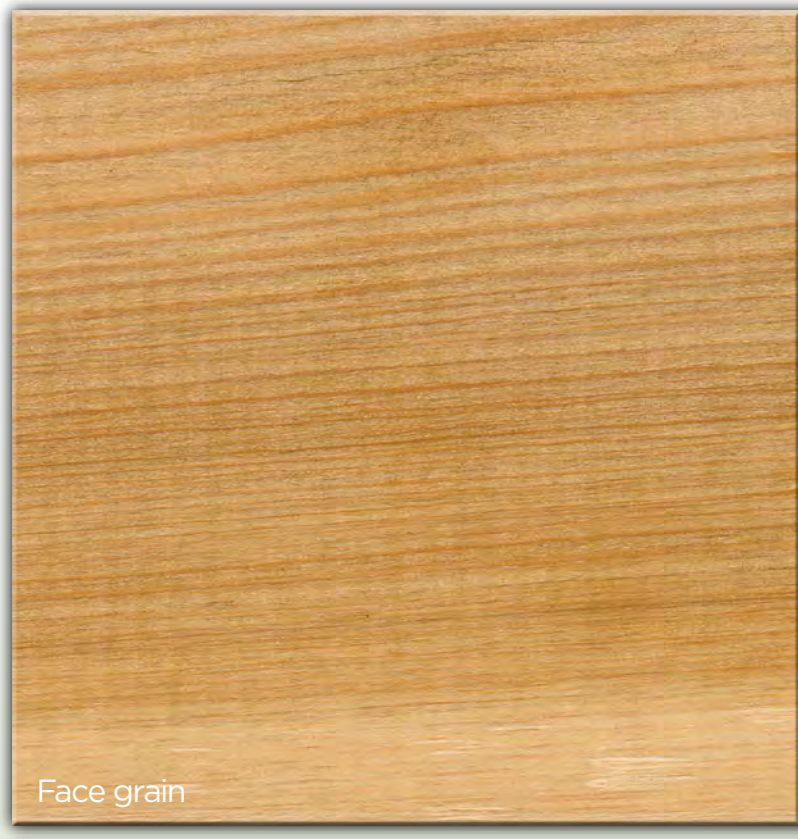
Bald cypress

Taxodium distichum

Commonly called cypress, southern cypress, red cypress, white, or even yellow cypress, this tree grows principally in the southern United States on riverbottoms or set sites, but finds its way up the Mississippi River into the Bootheel of Missouri. The bark is dark reddish brown, divided by long, loose shreddy ridges. Its heartwood is noted for durability against rot and decay. The color of the heartwood varies widely, ranging from light yellowish brown to dark brownish red, brown, or chocolate brown. The sapwood of bald cypress is narrow and nearly white, and not durable against decay. The wood is fairly light in weight and moderately strong, hard and stiff, but somewhat difficult to work with tools. Shrinkage is relatively minor, but somewhat greater than that of cedar, and less than that of southern pine. The wood has a slightly oily feeling and may have a rancid odor. Frequently, cypress trees will have pockets or areas attacked by a fungus. This wood is called pecky cypress and is popular as paneling. The growth rings are distinct and the wood is moderately easy to dry.

Cypress has been used widely by planing mills for sash, doors, exterior trim, siding and posts, beams and other members in docks, as well as warehouses, bridges, and railroad ties. It has also been used for caskets, tanks, boats, railroad car construction, poles, piling, shingles, slack cooperage, and fence posts. It is planted as an ornamental throughout the state, and with care it develops into a large and unusual shade tree. Cypress is a good wood for home workshop use, but its use is restricted by limited range in Missouri and few mills are able to get cypress logs to saw into lumber.





Red cedar

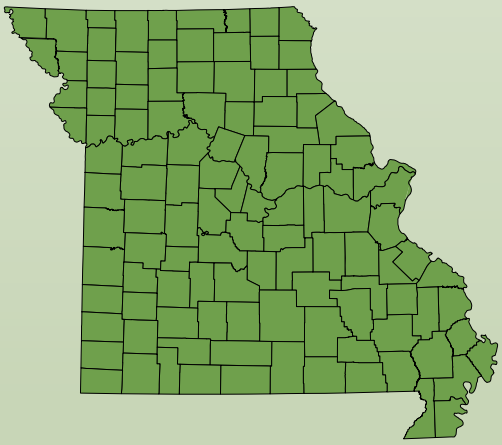
Juniperus virginiana

Also called eastern red cedar, cedar, and aromatic red cedar, this tree is not a true cedar at all. It is a juniper that grows throughout Missouri, although it is most common in the southwestern Ozarks. It is an invader of old fields and often occurs along fence rows where birds have dropped seeds. It may grow rapidly or slowly, depending upon the site and competition.

The two most distinguishing features of the wood are its odor and its light to dark or pinkish-red heartwood. Only the heartwood contains the delicate and distinctive odor, which comes from a light oil. Slow-growing trees contain a high percentage of red heartwood, whereas old field or other fast-growing trees are mostly sapwood, which is a creamy white color. The bark is tan to reddish brown and shreddy. Almost always the wood is very knotty. It is fairly lightweight, somewhat low in strength and quite brittle, but is a good wood to work. The texture is fine and uniform except where deflected by knots. It shrinks very little and is stable when dry. The growth rings are distinct.

In spite of its usually small size, red cedar is a popular wood. It is used in cedar chests because the fragrance is said to inhibit insects that attack clothing. As shavings, it is popular for pet litter because the odor is said to fend off fleas and mites, and the oil gives the pet's coat a nice shine.

In Missouri, this species is also used for closet linings, novelties of many types, paneling, and fence posts. The heartwood is very resistant to decay while the sapwood is not. It is a pleasant wood to work in a home shop and is often available around small sawmills.

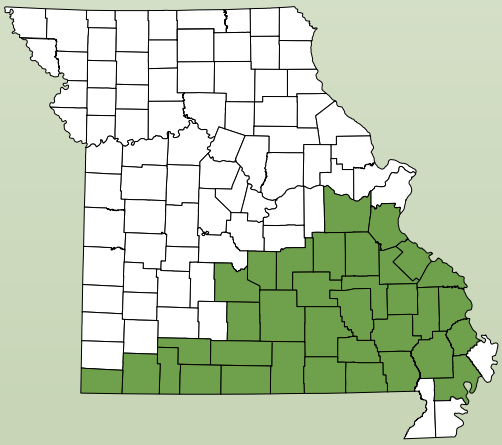


Short-leaf pine

Pinus echinata

Short-leaf pine is the only pine native to Missouri. It is one of the four principal southern yellow pines, and lumber from any one or a mixture of them is lumped together and called southern pine. It is generally found in Missouri on dry, sandy soils, frequently of sandstone origin. It occurs in small pure stands, but is most often mixed in with oaks and hickories. Its range is from the counties along the Arkansas border north through the central and eastern Ozarks.

The woods of southern pine species are quite similar in appearance. The sapwood is yellowish to white and usually quite narrow. The bark is rough with a scaly appearance. Older trees have large, irregular plates of a cinnamon red color. Short-leaf pine is moderately heavy, strong, hard, and stiff. All the southern pines have a moderately large percentage of shrinkage, but are stable when properly seasoned. Throughout its native range in Missouri, pine is available as lumber. It is frequently planted as an ornamental tree. The rings are distinct, and there is an abrupt transition from springwood to summerwood. Pine products find use as lumber, sheathing, sub-flooring, boxes, millwork, pallets, railroad ties, posts, and poles. It is a major pulpwood species in southern states. Pine must be treated with preservatives if it is used in ground contact, as the heartwood is only moderately durable. Southern pine plywood, while not manufactured in Missouri, is readily available at retail lumber yards throughout the state. Resinous splinters of the heartwood are known to everyone who has lived in the Ozarks as "fat pine" or "light-wood." It makes an excellent fire starter for wet or green wood. The lumber is excellent for home workshop use when properly dried.



Hardwoods

Noppadol Paothong

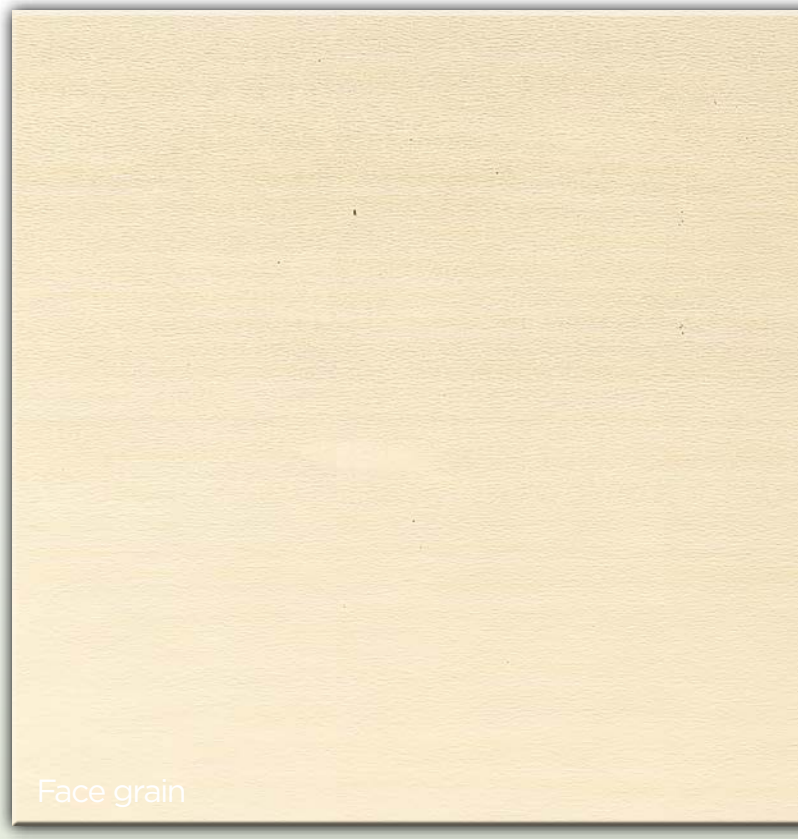
American holly

Ilex opaca

Also called holly, prickly, or evergreen holly, this is the whitest of all American woods. It is better known for its bright red berries and spiney green leaves at Christmas than for its lumber. A more southern and eastern species, its range in Missouri is limited to the moist, well-drained sandy soils of Crowley's Ridge in southeast Missouri. It is also frequently planted as an ornamental throughout the state, but does not survive cold winters well here.

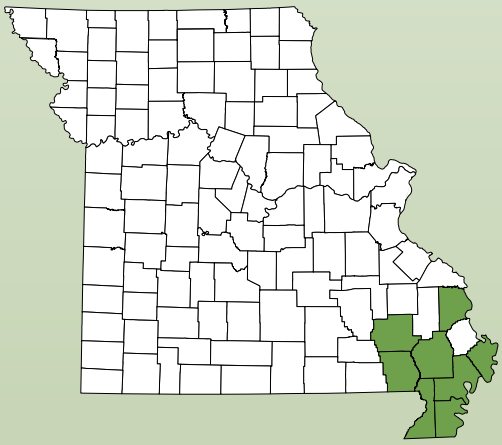
Both the sapwood and the heartwood are a uniform ivory white color, although it quickly becomes blue-stained if not properly cared for after cutting. The bark is light gray, thin, and smooth with little warts. The wood has no characteristic odor or taste, is close-grained, and diffuse porous. It is moderately hard, tough, but not strong, and requires considerable care in drying to avoid checking and warping. It is not durable when exposed to conditions favoring decay.

The wood of holly is not abundant, but is available. It takes dye or stain well, but is favored for its pure white color for inlays and marquetry where the white color contrasts with darker woods. It is also used in carvings, fine furniture, some cabinet work, small turnings, small musical instruments, piano keys, wood cuts, novelties, and handles. The fine grain makes it suitable for wood engraving. It is an interesting wood for the home workshop.


Face grain


End grain


Bark




Face grain (white ash)


End grain (white ash)


Edge grain (white ash)


Bark

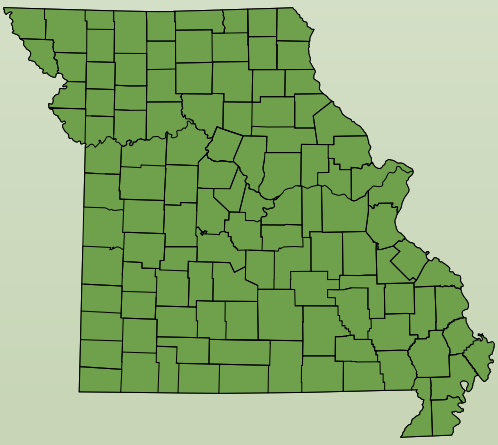
Ash

Fraxinus spp.

This group includes white ash (*F. americana*), green ash (*F. pennsylvanica*), and blue ash (*F. quadrangulata*). There are botanical differences between these species of ash in the tree form, but the woods of the ashes are generally similar. Some smaller species of ash are not commercially important. Commercial white ash consists mostly of white ash and green ash. These two species are common throughout most of Missouri. Ash grows best on deep, moist soils, especially along major streams. These trees are also planted widely along streets and in yards as ornamentals.

The heartwood of ash is generally brown, while the sapwood is light yellow, cream-colored, or nearly white. Second-growth trees have a large proportion of sapwood. The bark is light gray, with ridges forming a diamond pattern in both white and green ash. Blue ash bark has a "fish scale" pattern. The wood is moderately heavy, strong, hard and stiff, and has a high resistance to shock. It retains its shape well and resists warping and shrinking. The grain is quite pronounced, and the wood is ring porous. The wood has no odor or taste and may be used for woodwork that comes in contact with foods.

It is used for baseball bats, hockey sticks, tool handles, oars, solid furniture, slack cooperage, veneer for furniture, and interior trim. It stains easily and finishes well. In the case of handles, ash is preferred for lifting tools because of its lighter weight, while hickory is better for striking tools because of its greater strength. Where available, ash is an excellent workshop wood where strength and resilience are specific requirements. It also makes beautiful furniture.



Basswood

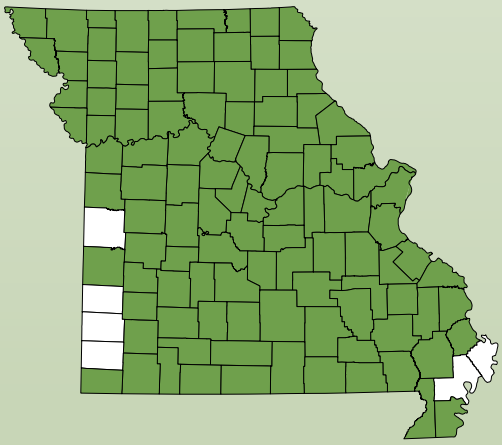
Tilia spp.

Two species of basswood occur in Missouri. American basswood (*T. americana*) is most common, but white basswood (*T. heterophylla*) is also present. The species are not separated commercially. Both species grow best on deep, moist soils. They are used frequently as shade trees.

American basswood, also called linn or lindenwood, is fairly common throughout northern Missouri, but also occurs in lesser quantities to the south. Some people prefer to call it "beetree" because honeybees often build their hives in hollow basswood trees. The wood is commonly used to build beehives.

The sapwood is white or creamy white to pale brown. Very little difference exists between the sapwood and the heartwood except the heartwood occasionally has darker streaks of brown. The bark is gray in young trees, then turns brown and has long, narrow ridges on older trees. When dry, the wood is without odor or taste and is lightweight with even texture and grain. It is easy to work, though shrinkage in drying is a problem. However, it is stable when dry. Growth rings are fairly distinct and the wood is diffuse porous.

Few woods are used in so many ways. Uses include apiary supplies, venetian blinds, sash and door frames, molding, woodenware, boxes, drawing boards, picture frames, toys, wooden novelties, and other objects requiring a clean-looking lightweight wood that finishes well. It is a very popular carving wood and has been used in the automotive industry for patterns. It is an excellent wood for the home workshop, but is not desirable for exposed parts of furniture because it dents rather easily.



Beech

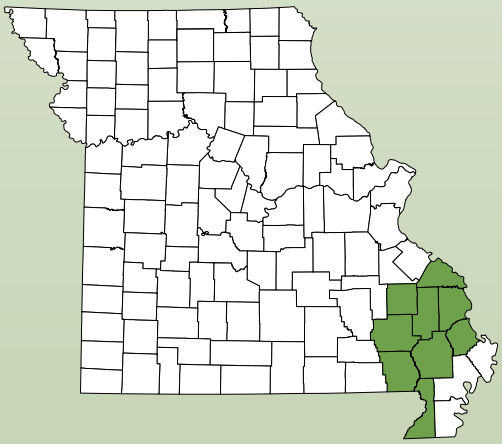
Fagus grandifolia

American beech is the only beech native to the United States. It has a limited range in Missouri, restricted mostly to well-drained, sandy soils in southeast Missouri.

Beech wood varies in color from nearly white sapwood to reddish-brown heartwood in some trees. Sometimes there is very little difference between the sapwood and heartwood. The bark is gray-blue, thin, and quite smooth. The wood is fine-grained, with little grain character, but has a distinctly visible ray fleck. It is hard, strong, stiff, and shock-resistant. It dresses smoothly and sands to a high polish. When steamed, it is easily bent. The wood imparts no odor or taste and consequently is widely used for food containers.

Beech has a large percentage of shrinkage and requires careful drying. It turns well on a lathe and is rather easily treated with preservatives. The wood is diffuse porous and the growth rings are distinct.

Beech, though not abundant in Missouri, is used extensively for furniture, chairs, turnings, brush backs, flooring, shoe lasts, tool handles, woodenware, drawer sides, bentwood parts, shuttles, spools, and bobbins. When treated, it is suitable for railroad ties. It accepts a variety of stains well and is also suited to lacquer or varnish finishes of good quality. In addition, it is used in boxes, crates, and pallets. It is good for home workshop use where available and properly dried.



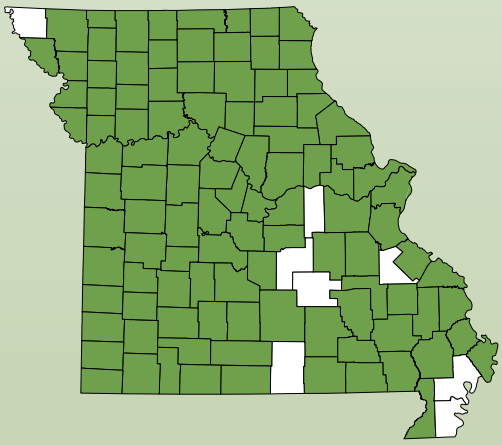
Black cherry

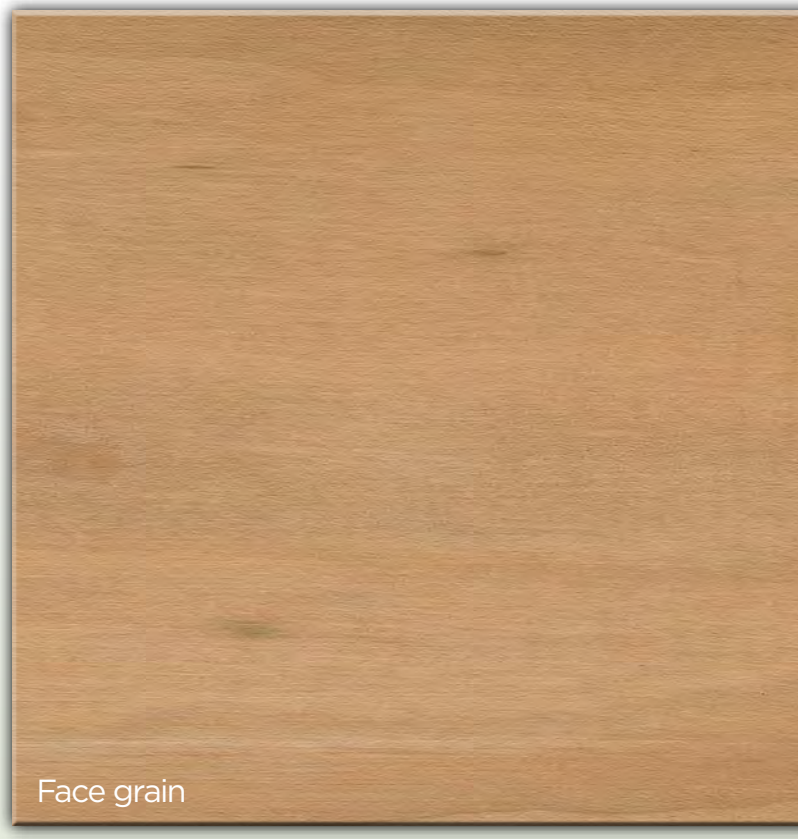
Prunus serotina

Black cherry is also called wild cherry, wild black cherry, rum, or whiskey cherry, and just plain cherry. It is a member of the rose family, as are the apple and peach, and therefore is sometimes referred to as "fruitwood." It is probably found in every county of the state. It will grow on almost any site, but attains its best form and quality on rich, moist soils on north- and east-facing slopes.

The heartwood is a light reddish to orange-brown color, sometimes with a greenish cast. The sapwood is creamy white or yellowish and most often quite narrow compared to the reddish heartwood. The bark is dark reddish brown, smooth at first, then becoming fissured, scaly, and almost black in older trees. The wood is semi-ring porous and close-grained. Plain and quartered sections show annual growth rings clearly, but sometimes they are less distinct on the end grain. The wood is moderately easy to dry and exceptionally stable. In Missouri, cherry often has dark mineral stain and gum pockets, which detract from both its beauty and value. It machines and sands well, but will burn against a saw blade or router bit. In the marketplace, it ranks second only to walnut as a cabinet wood, but the scattered availability in Missouri reduces its value.

The wood is used in fine furniture, wood carving, paneling, and engraver's blocks. It is available as veneer and lumber, although high-grade black cherry is hard to find. It is an excellent wood for home workshops.




Face grain


End grain


Edge grain


Bark

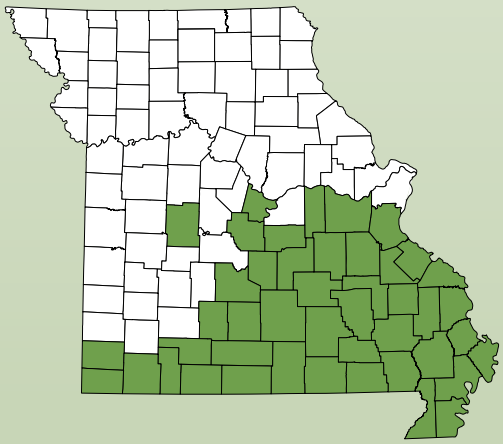
Black gum

Nyssa sylvatica

A tree native to the Ozarks and the Bootheel area of Missouri, it may also be called tupelo, sourgum, tupelo gum, or pepperidge. Upland black gum is harder and heavier than its bottomland relatives. It is one of the first trees in the Ozarks to color in the fall. The leaves turn a deep, bright red. It grows on both upland and lowland sites, but reaches better size and form on deeper or richer soils.

The wood is nearly white in the sapwood, sometimes with yellowish or brownish streaks in the heartwood. The bark is reddish brown, almost black, deeply fissured into irregular and block-shaped ridges. The grain is interlocked and the wood is diffuse porous. There may be almost no color difference between sapwood and heartwood, causing growth rings to be difficult to see, resulting in wood with little character. Its texture is fine and uniform, but it is difficult to dry without considerable warp and twist. The wood is very difficult to split, average to below average in machining characteristics, and below average in steam bending. It is not durable when exposed to conditions favoring decay.

A tough wood, it has been used for pallets and boxes, moldings, furniture parts, and railroad ties. The lumber is generally of common grade and mixed in with low-grade hardwood lumber in the market. It also has been used as pulpwood for paper making, and many other uses in the past, but it seems less in demand today. The wood is of questionable value for home workshops considering the variety of other woods that are available.



Black locust

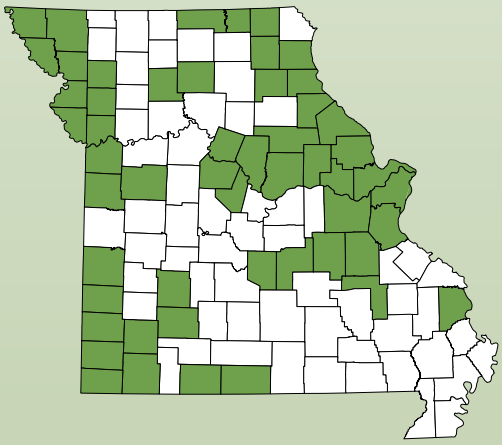
Robinia pseudoacacia

This tree has also been referred to as yellow locust, locust, and shipment locust, and was originally native to the Ozarks. The tree is now distributed throughout the state. It is fast growing and has been used to stabilize eroding soils. A member of the legume family, it is also well-known around old farmhouses and in city parks. It grows best on fertile limestone soils and is very susceptible to the locust borer, which has destroyed many locust plantings.

The sapwood is yellowish green and narrow in most instances. The heartwood is greenish yellow to dark yellow, greenish, or golden brown. The bark is brown, thick, deeply furrowed, with rough, forked ridges. It is ring porous with a fairly prominent grain. The springwood pores are large and are completely occluded with tyloses in the heartwood.

Locust is without a characteristic odor or taste and very heavy, very hard, and very strong in bending. It is moderately low in shrinkage, turns well, but is hard to work with hand tools. Wood rays are generally visible to the naked eye. The wood is very durable and may be confused with Osage orange. Osage orange, however, is usually a deeper shade of yellow and the yellow coloring matter readily dissolves when shavings are placed in tepid water. Very little color can be extracted from black locust by this method.

The wood is excellent for home workshop projects, but there are so few trees available that it is not commercially important. However, it does appear occasionally at sawmills. The tree has been widely used for fence posts and telephone pole insulator pins, but today the lumber is generally sold locally for farm use.




Face grain


End grain


Edge grain


Bark

Black willow

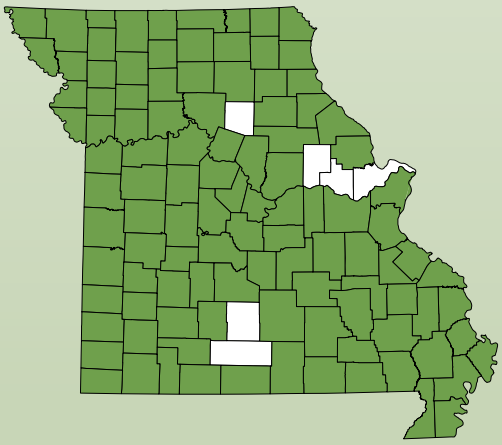
Salix nigra

This species is known in the casket trade as "Salis" and elsewhere as swamp willow or willow. It is the largest and most widely known of our native willows. It reaches its best size on rich bottomland soils, but is found throughout the state around almost any water source. It is generally associated with cottonwood, soft maple, elm, sycamore, and box elder. It sprouts readily and often is the first species to invade newly deposited, bare soils in river or creek bottoms.

The sapwood is gray to light tan, in some cases nearly white. The heartwood varies from light gray to dark or reddish brown. The bark is dark brown or blackish, with deeply furrowed, scaly, forking ridges. Texture of the wood is fairly uniform to a little coarse, and is diffuse porous, but growth rings are not distinct. It is a soft hardwood, similar to basswood in some ways, and is easy to work. It tends to be a little fuzzy when sawn or sanded, but generally is easy to machine. It dries easily, although it tends to warp and crook unless restrained. It is stable when dry. It has a slightly sour smell when green, but little odor after being dried. It is generally considered not durable when exposed to conditions favoring decay.

The woods of Salix and Populus are very similar, but can usually be separated by color. The willows exhibit a decided brown or reddish-brown cast in contrast to the grayish-white or light grayish-brown shades that characterize Populus species.

Willow is sawn primarily into lumber. It is somewhat weak, although used in boxes and crates, inexpensive furniture, paneling, beekeepers' supplies, and toys. The wood glues and stains well and is easily adapted to workshop projects.



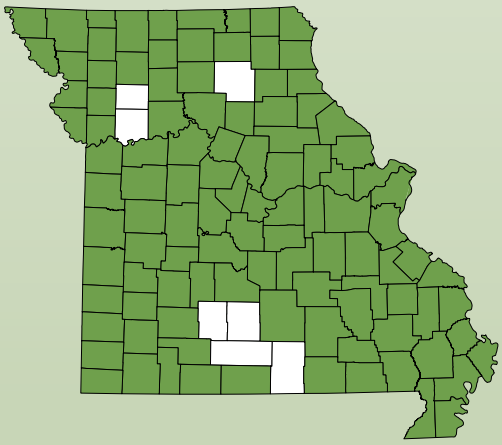
Box elder

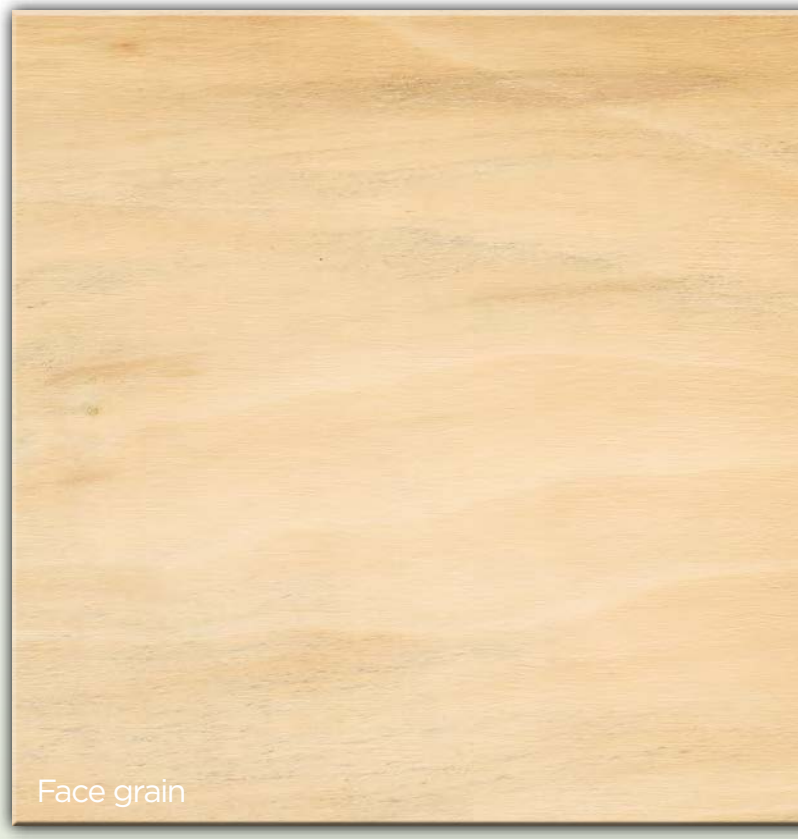
Acer negundo

Sometimes called Manitoba maple or ash-leaf maple because it has a compound leaf (typical of ash), this tree actually belongs to the Acer (or maple) genus. The tree is found throughout the state along river and creek bottoms. It may occur in fairly large pure stands, though it is often associated with cottonwood, soft maple, elm, sycamore, and black willow. It is a common tree in yards since it tolerates great extremes in soils and grows rapidly into an adequate shade tree.

The sapwood and heartwood are not clearly defined in box elder. The wood is generally a creamy white to greenish-yellow or yellowish-brown color. A distinguishing characteristic in the heartwood is the presence of coral or pinkish-red streaks of a soluble pigment. The bark is thin, light brown, or pale gray with narrow ridges and fissures. The wood is close-grained and diffuse porous. It is lightweight, soft, and not strong. The dry wood has neither odor nor taste. It is stable when dry, machines well, but is not durable.

Box elder is generally combined with other low-grade bottomland species in the commercial market and finds it way into crates, boxes, inexpensive furniture, and occasionally pallets. Although not common at sawmills around the state, it makes an acceptable wood for home workshops.





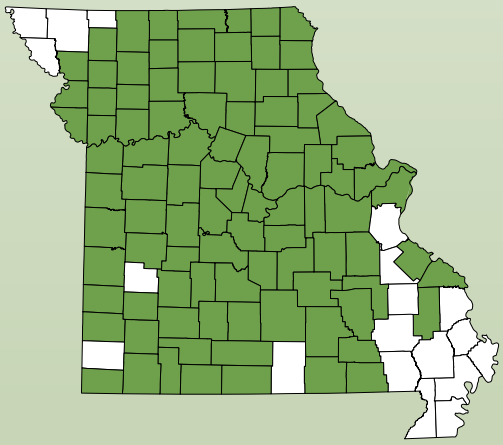
Buckeye

Aesculus spp.

Ohio (*A. glabra*) and yellow (*A. octanora*) are the major species of buckeye. Ohio is most common and is sometimes called "fetid" or "stinking" buckeye because of the nauseating odor of the bruised bark. Yellow buckeye may also be called sweet buckeye and has a much larger fruit than Ohio buckeye. These species are combined in the trade and can be utilized for the same purposes as aspen, basswood, and yellow poplar. Buckeye is found on moist, limestone soils, frequently in river drainages. It is a desirable ornamental.

The wood is nearly white in color. The white sapwood blends gradually into a creamy-white heartwood. The bark is gray, furrowed, and broken into scaly plates. It is very soft in texture, close-grained, not strong, but generally straight-grained, and low in shock resistance. It is rated low on machineability such as shaping, mortising, steam bending, boring, and turning. The grain is quite plain and is seldom used in a natural finish. However, it takes paint and enamel very well. The wood is diffuse porous, and the growth rings are not distinct.

Buckeye in lumber form has been used principally for furniture, boxes and crates, food containers, woodenware, novelties, and planing mill products. It is also used for toys, carvings, and picture frames. It is not generally commercially available in Missouri, but is a desirable wood for home workshop use within its limits.



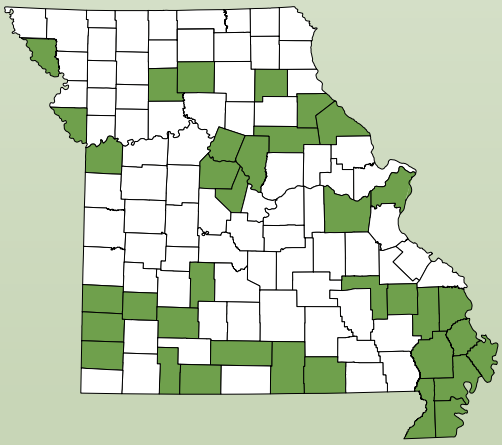
Catalpa

Catalpa speciosa

This tree is also called northern catalpa, hardy catalpa, cigartree, or western catalpa, and is a separate species from southern catalpa (*C. bignonioides*) While only northern catalpa is native to Missouri, both species occur in scattered locations in the state. It has been used as both a windbreak planting and an ornamental in yards. The large, white showy flowers are most attractive and fragrant, and the tree reaches a large size quickly. Originally, northern catalpa was native to bottomlands and rich soils of southeast Missouri.

The sapwood is creamy white to pale gray, usually narrow, while the heartwood is a warm gray-brown or reddish brown, occasionally with a lavender tinge. The bark is light grayish or reddish brown with shallow furrows and flat, scaly ridges. It has no characteristic taste, but may have a faint aromatic odor. The wood is usually straight-grained, moderately lightweight, soft and weak in bending, but is very durable. It is ring porous and the pores are partially blocked by tylosis. The dry lumber is stable and machines well. It takes a finish well if the large pores are filled.

Because the tree is not abundant statewide, it is not a common wood at sawmills. However, because of its natural durability, it makes excellent fence posts. It is also said to be an excellent wood for musical instruments. The grain and texture are attractive, and it is a desirable wood for home workshops when available.



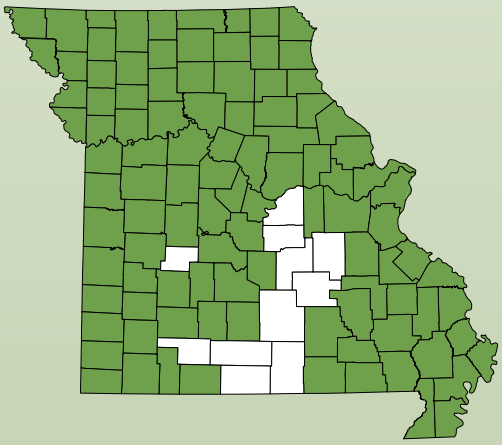
Cottonwood

Populus deltoides

Also called eastern cottonwood, this is our most common poplar species and a very important timber species. Cottonwood is found throughout the state, both wild and planted as an ornamental. Swamp cottonwood, another species, is also native, but is limited in range to 10 or so Bootheel counties. Cottonwood is typically a bottomland species, but will grow on almost any site. It is one of the largest of our native trees. It is usually found either in pure stands or mixed with willow, sycamore, hackberry, elm, green ash, river birch, silver maple, and box elder.

The sapwood may be white to light tan with the heartwood a very light brown, perhaps with a greenish or grayish cast. The bark on young trees is yellowish green and smooth, becoming ashy gray with deep furrows and short, platy ridges on older trees. The annual growth rings are not obvious, and the wood is diffuse porous. The wood is close-grained, somewhat coarse, and difficult to split. It has a characteristic sour smell when both green and dry. The wood is not difficult to dry, but gets blue stain fungi quickly when green, and it also warps, twists, and cups if not properly stacked. It machines easily, but dulls tools to some degree. The wood is not durable when exposed to conditions favoring decay.

Cottonwood is used for many purposes including boxes and crates, farm lumber, woodenware, excelsior, and pulp. It does not finish well and is not suitable for cabinet work. Box and basket veneer are sometimes peeled from large logs. The wood is soft and light in weight and has practically no figure. It is a good wood for general workshop use, but not for furniture, though it may be used for drawer sides.



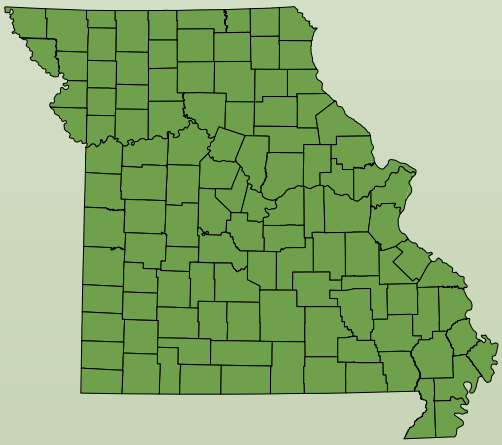
Dogwood

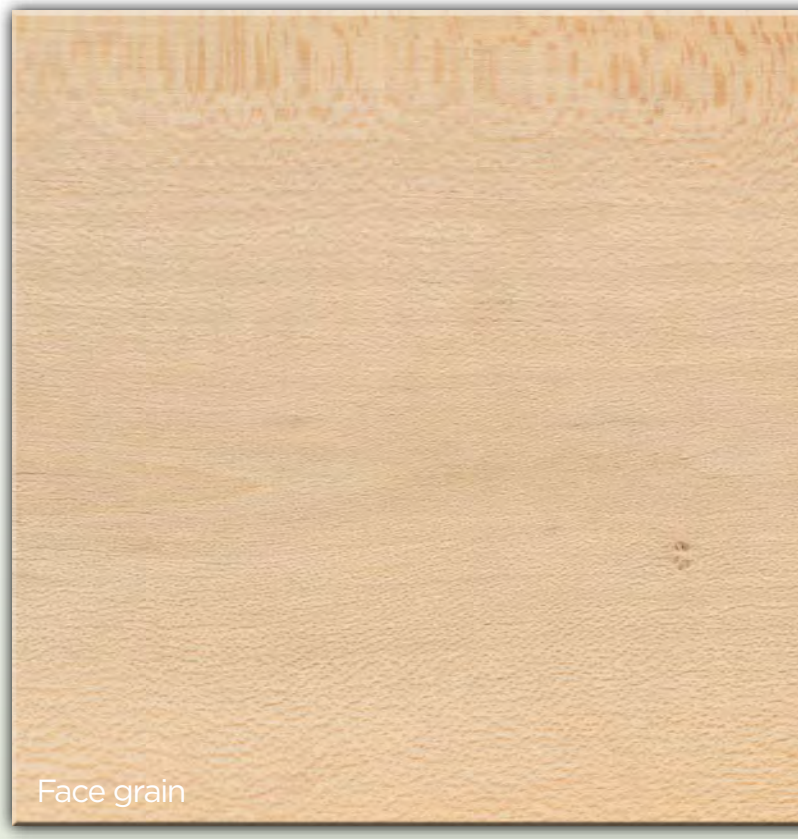
Cornus spp.

Flowering dogwood (*C. florida*) is included here because it is a common tree in Missouri and is famous for the beauty of its spring blossoms. It is the official state tree of Missouri. Flowering dogwood is more common in the Ozarks, but rough-leaved dogwood (*C. drummondii*) is more common throughout the state. None of the dogwood species is important commercially. They are common understory trees in oak-hickory forests. Dogwood has been extensively planted as an ornamental throughout the state and seldom grows larger than 6 to 8 inches in diameter and 30 feet tall, even on good sites.

The sapwood is a pale to light pinkish brown and usually very wide. The heartwood is darker brown, frequently variegated. The bark is dark reddish brown, thin and broken into small square or rounded blocks. The wood has no characteristic odor or taste, and is heavy. It is quite hard, strong, and tough for its weight. However, it is difficult to work with tools, wears smooth with use, glues poorly, and is difficult to dry. For a dense wood, it shrinks considerably. The growth rings are distinct, and the wood is diffuse porous. Texture is even and close, but the wood is not durable.

The woods of the dogwoods cannot always be identified with certainty, but that is of little importance, since the trees are mainly ornamentals. In the past, their commercial uses were for shuttles for textile weaving, spools, bobbin heads, golf club heads, and bearings. Uses were related to its hardness and smoothness under wear. These woods are not commercially available in Missouri, although they can be useful for small turnings and novelties in the home workshop.





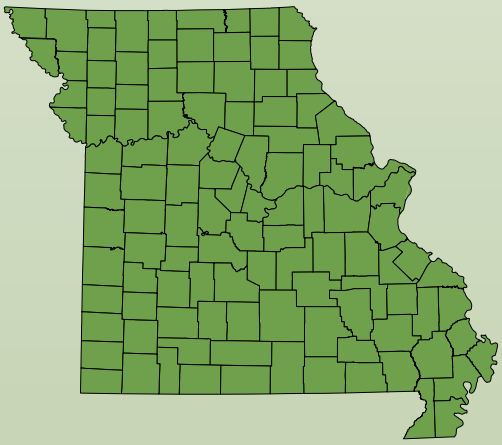
Eastern redbud

Cercis canadensis

Eastern redbud, sometimes called Judastree, is one of our most beautiful spring flowering trees. It grows throughout the state and generally is a small understory species that does not exceed 12 inches in diameter. In addition, it is planted throughout the state on all types of soils in yards, parks, and along streets. Generally speaking, the better the soil, the larger it will grow.

The sapwood is creamy white and usually narrow. The heartwood is greenish to yellowish brown, which turns a rich orange-brown after exposure to sunlight. The bark is thin, dark brown, and furrowed into narrow, scaly plates. The grain is generally straight. The wood is ring porous and moderately hard. It glues well and machines easily.

The tree is of little value except as an ornamental. However, woodworkers can cut blocks of wood from redbud trees being removed from yards or parks and make useful novelties from the lumber. It is generally too small or short to saw in a sawmill, but can be ripped into boards with a chainsaw, dried, and run through a planer to bring it to a workable size.



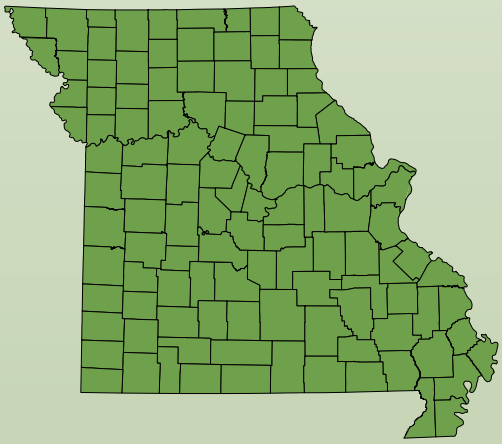
American elm

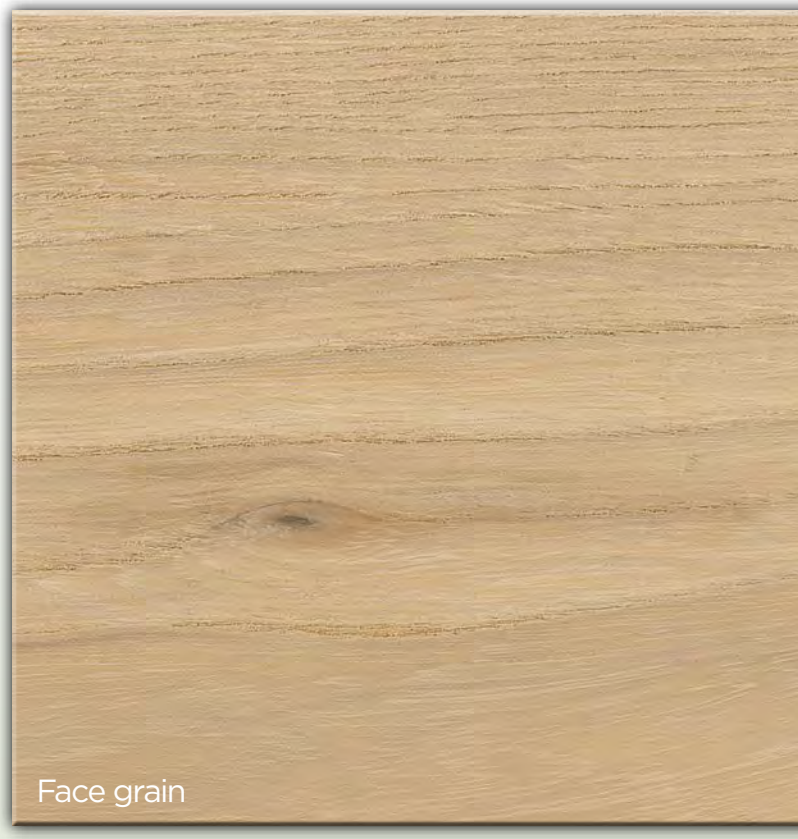
Ulmus americana

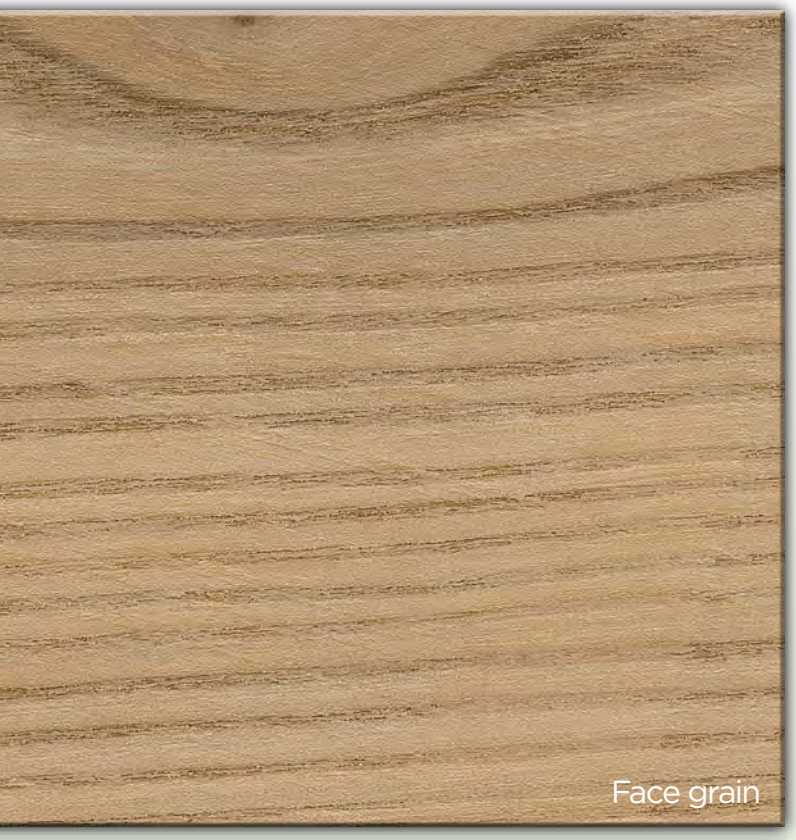
American elm is our best known shade tree and grows throughout the state. It is also called white elm, soft elm, and water elm. American elm grows on a variety of sites, but attains its best growth in bottomlands where it is associated with silver and red maple, box elder, cottonwood, bur oak, and hackberry. It is one of our largest native species when growing on a good site. The tree is subject to serious tree diseases and defoliating insects.

The sapwood is generally creamy white and the heartwood a pale brown to dark brown. The bark is gray, deeply furrowed with broad ridges and thin scales. Although of medium density, elm wood is strong and tough for its weight, elastic, and shock resistant. The wood is ring porous and has an interlocked grain, which makes it very difficult to split. It has excellent bending qualities and is somewhat coarse in texture. The wood finishes well and is easy to stain, but is not durable. Annual growth rings are clearly defined.

American elm is widely used as veneer for some fine furniture and wall paneling. Other uses include the slack cooperage industry for staves, heading, and hoops, the manufacture of baskets, bent parts for furniture, and general farm use. It is commonly used in wooden pallets, boxes and crates, and sporting goods. Some inexpensive firearms have elm stocks. For specific uses, it can be a desirable species in home workshop use, but it is not a versatile wood.







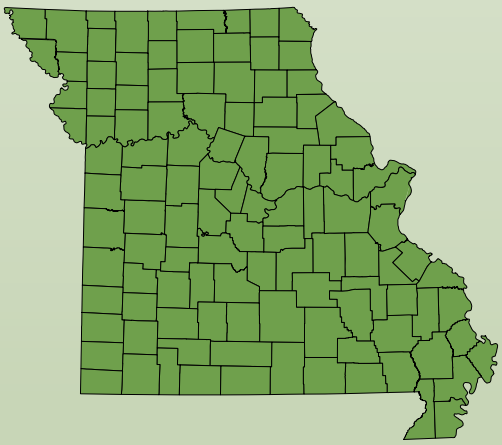
Slippery elm

Ulmus rubra

Also commonly known as red elm and soft elm, slippery elm may be marketed as northern gray elm. It grows best on rich bottomland soils along streams and rivers. It is not commonly planted for an ornamental as is American elm. It will grow on more shallow soils of limestone origin mixed with American elm, sugar maple, basswood, white oak, red oak, ash, and walnut. It is found throughout Missouri.

The wood is of medium density, but is strong and tough for its weight. It is also elastic and shock-resistant. The bark is dark brown and thick, divided into braided ridges by shallow fissures. The inner bark is notable for its mucilaginous taste. The sapwood is grayish white to light brown and usually quite narrow. The heartwood is reddish brown to dark brown. The wood is ring porous with annual growth clearly defined. The texture is rather coarse, but the wood machines easily and bends well. It usually has interlocked grain and is difficult to split.

This species is not abundant at the mills, but is not rare. It is used for wall paneling, furniture parts, boxes, caskets, crates and barrels, toys, novelties, and agricultural implements. It is difficult to season because of its tendency to warp, twist, and shrink considerably. It may contain more than an average amount of ring shake. When available, it works well in home workshops.



Hackberry

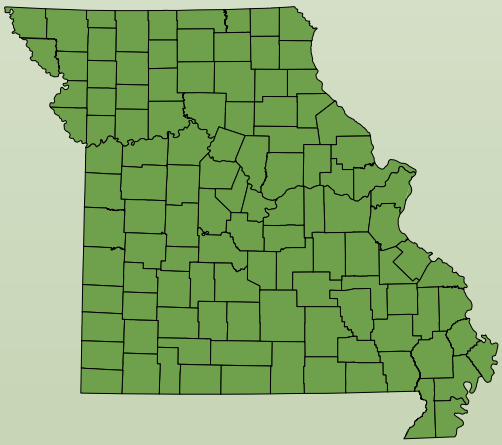
Celtis spp.

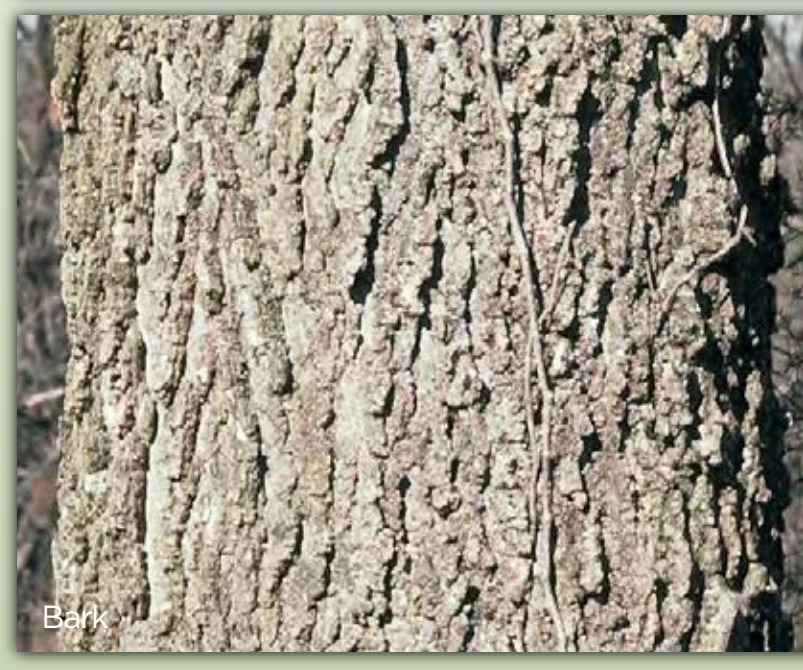
Common hackberry (*C. occidentalis*) is one of our most beautiful and neglected hardwoods. Sugarberry (*C. laevigata*), a closely related species, also furnishes much of the hackberry lumber in commercial trade. Both species are closely related to the elms. Hackberry grows to a large size and is generally found in riverbottoms, along streams, and on deep soils. It is associated with American elm, box elder, soft maple, cottonwood, and sycamore.

The wood is often a creamy white with no clear difference between the sapwood and heartwood. It may also be light yellow in color, and there may be gray to gray-brown streaks and patches in the heartwood. The bark is grayish to light brown with corky warts or ridges becoming scaly. The grain of the wood closely resembles that of the ash family.

The wood is ring porous with clearly visible annual rings. It is of medium density, hardness, and strength, without any characteristic odor or taste. The wood has good bending strength, is average in machining, shrinks moderately, and glues very well. It is unusually susceptible to sap stain and must be handled according to best drying practices to prevent this. It is capable of staining and finishing extremely well. The wood is not durable when exposed to conditions favoring decay.

The woods of both species are mixed in the trade and are sought for furniture frames and for boxes and crates. A flexible wood, it was once used for barrel hoops. It makes fine trim, woodenware, and wall paneling and is an excellent wood for woodworkers.





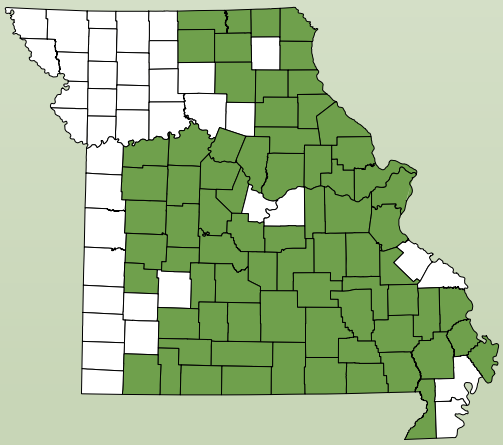
Butternut

Juglans cinerea

First cousin to black walnut, butternut is also called white walnut, American white walnut, and oil nut. The tree is perhaps better known in some areas for its oily but edible nuts than for its lumber. It is widely distributed over the eastern two-thirds of the state and not often found on prairie sites.

The wood is a soft tan, buttery, or light brown to fawn color. The bark is light gray to brown, furrowed into broad, flat ridges. The texture of the wood is rather coarse, and its grain closely resembles black walnut. Like black walnut, its color varies considerably between trees. The wood is semi-ring porous. Butternut is lightweight, soft, and easily worked. It machines and sands well, although it is noticeably softer than black walnut. It is a good cabinet wood, kiln dries easily, and is stable when dry. It is too weak for some uses.

Butternut has been used for paneling where its lighter color is an asset, and it is used in furniture. In the olden days, it was a favorite of architects because its lustrous and satiny appearance gave dignity and luxury to design. Limited amounts of veneer and lumber are available because the overall supply appears to be diminishing. Butternut is a nice wood for home workshops, and a favorite of wood carvers. The sticky hairs of the husk of the nut carry a strong brown dye that does not wash off easily.



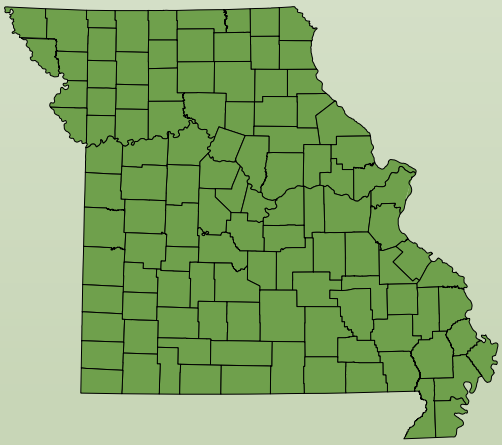
Hickory

Carya spp.

The book *Trees of Missouri* lists seven species of hickory in Missouri, not including pecan. In the commercial trade, however, all hickory lumber is lumped together and no attempt is made to identify the species. The seven species are: shagbark (*C. ovata*), shellbark (*C. laciniosa*), mockernut (*C. tomentosa*), pignut (*C. glabra*), black (*C. texana*), bitternut (*C. cordiformis*), and water (*C. aquatica*). Hickories grow on all types of soils and sites throughout Missouri and are among our most common trees. Hickory probably made up about 10 percent of the original oak-hickory forest type in Missouri.

The sapwood is generally white to pale brown. The heartwood is pale brown to brown or reddish brown. The bark varies by species, from the shaggy plates of the shagbark and shellbark to the shallowly fissured ridges of mockernut and black, to the smooth gray bark of young bitternut and pignut. The growth rings are usually distinct, and the wood is ring porous. The wood is heavy, hard, elastic, and strong. It machines and turns well, and also steam bends well. The wood is not durable.

Hickory is one of our most common woods in everyday use. It is the preferred material for handles of axes, picks, hammers, hatchets, and ladder rings. Where impact strength is a consideration, hickory is often used. It has been used in athletic equipment such as skis and as runners on sleds. In days of wooden wagons, hickory was used for the hub, rims, and spokes of the wheels. It is used in wooden pallets and blocking. Better grades are used in furniture and for wall paneling. One of the most important uses for hickory is in the charcoal industry where hickory smoke flavor is desirable. Hickory sawdust is used in packing houses to smoke meats. Because of its hardness, it is not commonly used in home shops, except when its highly regarded strength might be required.




Face grain


End grain


Edge grain


Bark

Black walnut

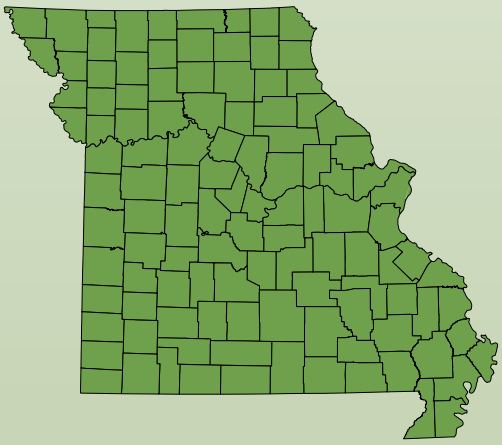
Juglans nigra

Also called American black walnut and eastern black walnut, this tree occurs in every county of the state, although it is generally found as isolated trees or small stands, and not in dense stands. It is one of the best known and most valuable trees in our state. A fast growing tree on deep, well-drained, almost neutral soils, it can also be found on almost any site except where it is constantly wet. It may be mixed with ash, cherry, basswood, sugar maple, white oak, hickories, or elm.

The sapwood is creamy white when freshly sawn, but can be steamed until it almost matches the heartwood. The heartwood varies considerably in color, from a light gray brown to dark purplish brown. The bark is dark brown to black, thick, and fissured in young trees or with deep furrows and blocky or platy ridges on older trees. It is semi-ring porous and growth rings are distinct. This one species produces a greater variety of figure types than any other tree. The wood is moderately heavy, very strong for its weight, and exceptionally stable when dry. It machines well and is an excellent carving wood. which finishes beautifully with almost any finish, and is easily worked with hand tools. The wood is very durable.

Walnut is used for fine furniture, gunstocks, picture frames and trim, paneling, fine cabinets, gift items, musical instruments, veneer, turkey calls, and countless other products. It is abundant, although the average size has been declining. Much high-grade walnut veneer has been exported to Europe and Japan.

The black walnut nutmeats are delicious and are collected for sale annually in great volume. They are extracted and used in candy, cookies, and ice cream, while the shell of the nut is graded into different sizes and sold as a filler and a cleaning and polishing agent. The wood is excellent for home workshop use.



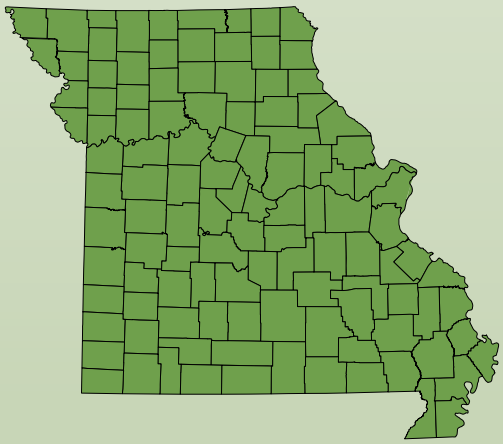
Honey locust

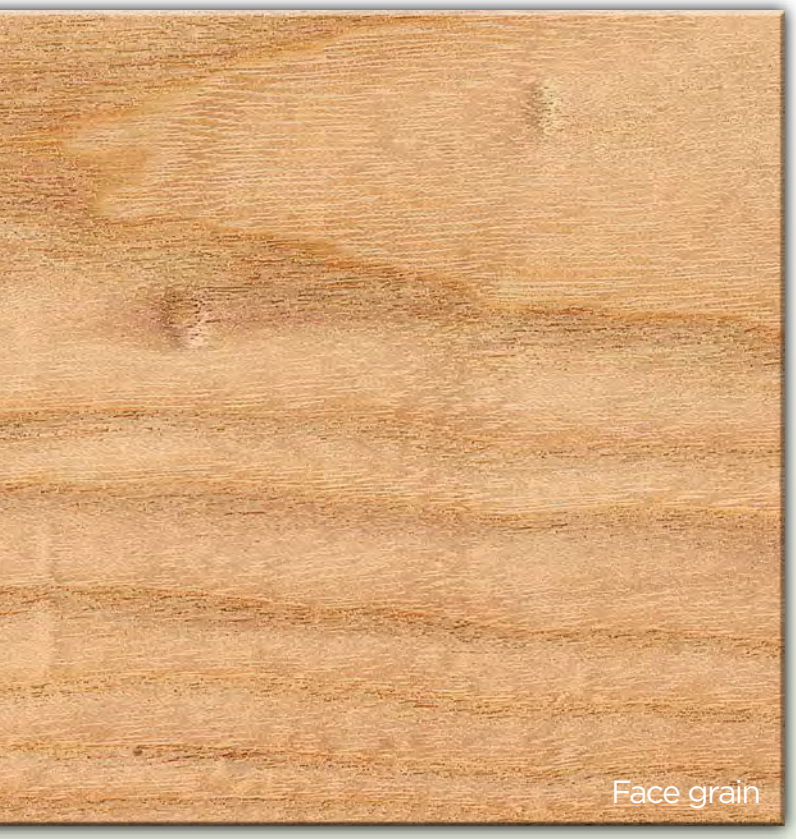
Gleditsia triacanthos

This rapidly growing tree is also called locust, thorny locust, sweet locust, or thorntree because of its sharp, dense thorns measuring 2 to 5 inches long. The tree is common throughout the state and is an invader of old fields. Farmers dislike the tree because its thorns easily ruin tractor tires. It is found on rich moist soils as well as dry upland fields, but usually as an individual or group of trees, and not as a major component of a forest. Thornless varieties are commonly planted in yards and along streets and parking lots.

The sapwood is creamy white to yellowish and the heartwood light red to reddish brown. The bark is iron gray, brownish, or black, fissured into long narrow scaly ridges. It is without characteristic odor or taste, and is heavy, hard, stiff, and has a tendency to split. It works well with tools, but does not glue well and tends to be somewhat brittle. It is ring porous. When dry, it shrinks little and is durable when exposed to conditions favorable to decay.

Limited quantities of lumber are available and for the most part go into low-grade markets. Locust is an attractive wood for paneling and furniture. It is used for fence posts, railroad ties, pallets, blocking, and fuelwood. When cut, the thorns create special problems. Its fruit, a pod with small seeds and a sweet pulp, is sought after by wildlife and cattle. Honey locust is an average wood for workshop use. It is sometimes confused with Kentucky coffee tree.





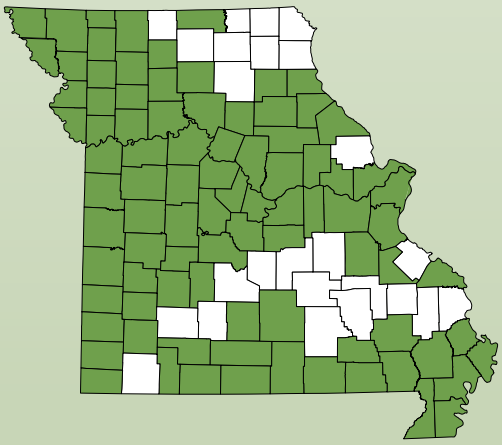
Kentucky coffee tree

Gymnocladus dioica

Coffee tree, bean tree, coffeebean, nickertree, or coffeenut tree grows throughout the state, although it is a scattered species, never in pure stands. It grows best on rich bottomland or in coves with deep moist soils. It may be associated with white oak, black walnut, basswood, red oak, elm, and pawpaw. It is named for the fact that its hard, round seeds were once ground, roasted, and brewed into a substitute for coffee.

The sapwood is yellowish white to cream-colored, while the heartwood is rich light brown to light red, or pinkish or reddish brown. The bark is gray to dark gray, deeply fissured, scaly with scales attached along one side. The wood has no special odor or taste, is usually straight-grained, and moderately heavy. It is ring porous with obvious growth rings. It may be confused with honey locust, because the large pores in the summerwood of coffee tree are readily visible with a hand lens and are arranged in clusters. In honey locust, these pores are barely visible and are more solitary.

The wood is moderately hard, strong, and coarse-grained. It makes beautiful paneling that weathers to a light chocolate brown. When dry, the wood is stable and machines well. It is also used for fence posts, crossties, rough construction, and fuelwood. Occasionally, it will show considerable ring shake, but is an attractive wood for home workshops. Coffee tree lumber is available, but not common. The seed pod of coffee tree is short (4 – 6 inches), thick (½ inch), and wide (2 inches) compared to the long, (6 – 12 inches), thin (⅛ inch), and narrow (1¼ inches) seed pod of honey locust.



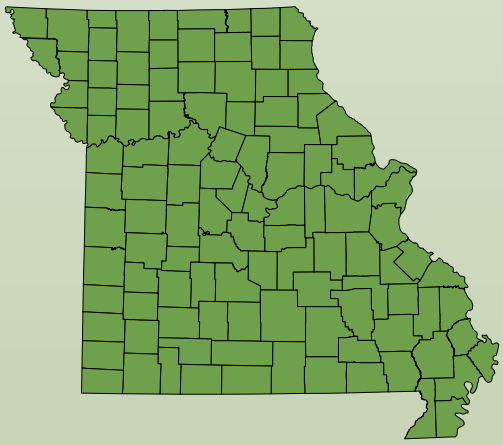
Hard (sugar) maple

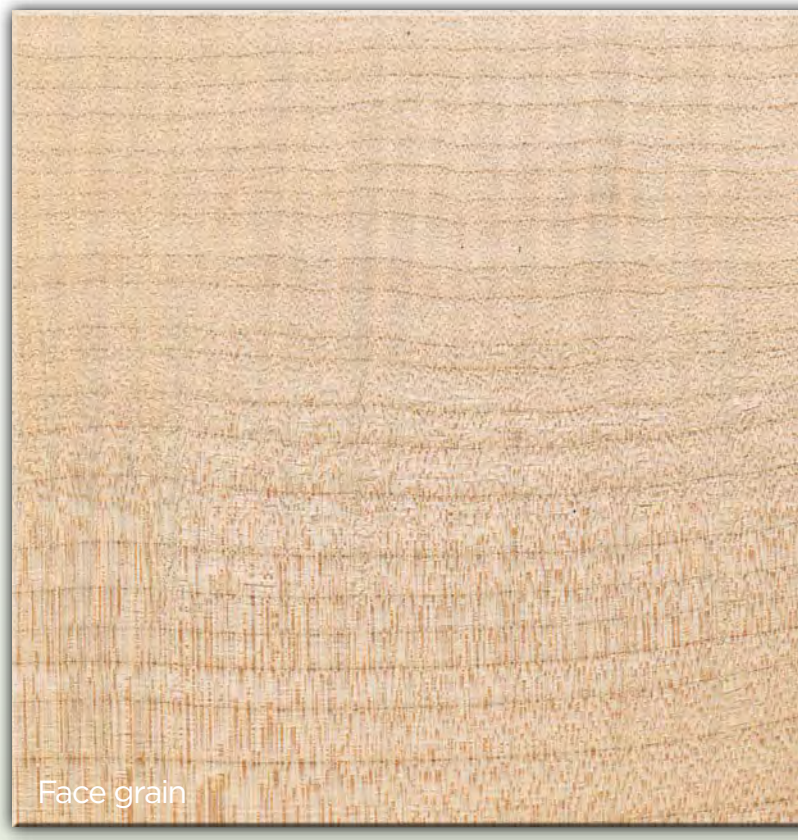
Acer spp.

Grouped together here are all of the hard maples, such as sugar maple (*A. saccharum*), black maple (*A. nigrum*), and Norway maple (*A. platanoides*). Name variations occur because of characteristics, so we have birdseye maple, curly maple, and fiddleback maple. The hard maples are generally distributed throughout Missouri, usually on rich, deep, moist soils. It is frequently an understory tree. On better soils, it is associated with ash, white oak, red oak, and basswood. On poorer sites, it will be found with oaks and hickories.

The sapwood of the hard maples is white with perhaps a reddish tinge, and the heartwood is a uniform light reddish brown. The wider the sapwood, the more the lumber is prized. The bark is brownish or grayish furrowed into irregular ridges or scales. Growth rings are fairly distinct, though the wood is diffuse porous. There is a considerable amount of commercial-size maple in Missouri, but it generally has an unattractive black mineral streak and occasional gum pockets. Most hard maple used in Missouri is imported from other states. The lumber machines well and is hard, sands to a high polish, stains well, and glues fairly easily. When dry, it is stable but tends to shrink and swell somewhat. It is not durable and tends to split along the rays.

The hard maples are perhaps more popular for their fall colors of red and yellow than for their lumber in Missouri. They are frequently planted in yards and along streets. Maple is used in furniture, cabinets, railroad ties, veneer, shoe lasts, bowling pins, flooring, turned items, toys, athletic goods, musical instruments, and some millwork. It is an excellent wood, which has been overlooked as a shop wood because of the mineral streak, but has many uses. It is not common at the mills, and what is sawn generally goes into low-grade products, such as pallets and blocking.





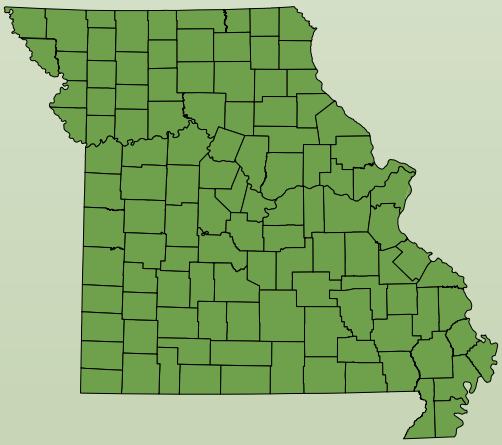
Soft maple

Acer spp.

The two most common species in this group are red maple (*A. rubrum*) and silver maple (*A. saccharinum*), which are combined in the lumber trade. Other names may be swamp maple and white maple. The name "soft" is a little misleading and generally only used to distinguish it from the hard maple. Soft maple grows throughout the state, with the red maple species found only in the southern half. It is typically a bottomland species, requires moist soils and is usually found with sycamore, elm, box elder, ash, hackberry, and cottonwood. Soft maple will grow in areas subject to fairly frequent flooding.

The sapwood is white to off-white. The heartwood varies greatly, from pale tan to reddish gray and often with brown streaks. The bark is gray, thin, and smooth on large trunks, broken into long, thin scales. It has no characteristic odor or taste and is usually straight-grained. Soft maple works well with tools, is moderately hard, and glues well. It finishes smoothly and is stable when dry. The wood is diffuse porous and the growth rings are not very distinct. It is fine textured.

The most important use of soft maple is in the furniture industry. It is used for the same purposes as hard maple except where strength and hardness are a primary requisite. The lower grades go into boxes, crates and toys, paneling, and core stock for veneers. It is not durable and will not stand outdoor exposure. It is a common ornamental tree around homes and along streets, although it does break up in ice storms. It is an excellent wood for the home workshop and is commonly available. Box elder is also commonly included with the soft maples in commercial trade.



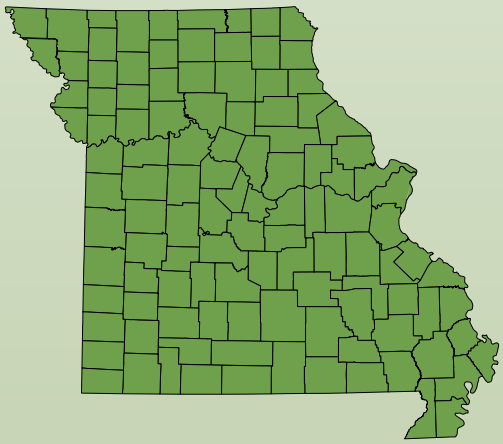
Mulberry

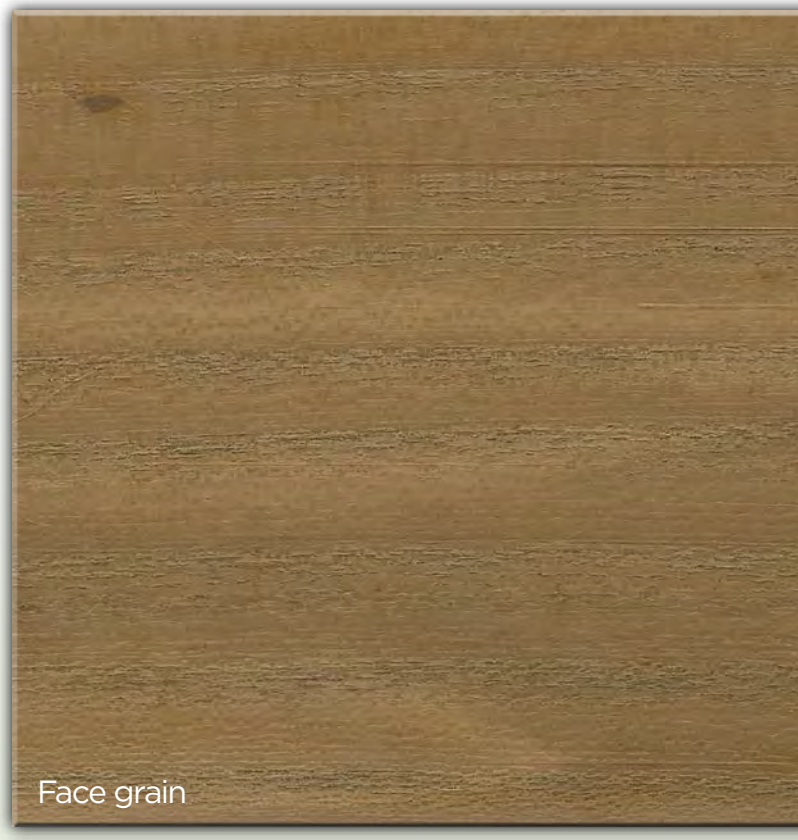
Morus spp.

Several species of mulberry are combined here. Red mulberry (*M. rubra*) is common throughout the state. It is a scattered tree associated with red and white oaks, elm, hackberry, sugar maple, and black walnut, growing on rich, well-drained soils. White mulberry (*M. alba*) was not native to Missouri, but is common in some areas today because of ornamental plantings. It is very similar to red mulberry. Paper mulberry (*Broussonetia papyrifera*) is an ornamental that has escaped cultivation in southeast Missouri and is fairly common in the Bootheel.

The sapwood of red mulberry is yellowish or creamy colored. The heartwood is orange-yellow to golden brown, turning russet-brown after exposure to air and sunlight. The bark is dark or chocolate brown, fissured, and scaly. The wood is hard, usually straight-grained, and very durable. The growth rings are distinct and the wood is ring porous. Little commercial use is made of this wood since merchantable-sized logs are scarce. The lumber machines well and is fairly stable after drying, but it has a fairly coarse texture.

These species are used locally for such products as fence posts and are planted as ornamentals. The fruit, while very attractive to birds, is messy and has a purple dye that is hard to remove. While difficult to obtain, mulberry is an attractive wood that can be made into many craft items in home workshops. It takes a high polish and would make attractive furniture items, if available. It has been used for wall paneling.





Oaks *Quercus* spp.

The oaks comprise the most important group of hardwood timber in the United States, including Missouri. No other wood is more widely used. In *Trees of Missouri*, Missouri's oaks are divided into two subgroups, the white oaks and the red oaks. Missouri has seven white oak species and 12 red oak species, as well as some additional hybrids. There are notable differences between the subgroups, which are important in selecting oak wood for use.

The white oaks:

This group has several features that distinguish it from members of the red oak group. As a rule, white oak bark is light gray or brown and is usually scaly or flaky. White oak acorns are sweet and mature in one season. The wood is also easy to recognize. Generally, the pores of white oak species are plugged with plastic-like growth structures called tyloses. Because of this, white oak wood has the unusual ability to hold liquids — a most important feature used by the tight cooperage industry. All bourbon whiskey produced in the United States must be aged in white oak barrels.

The red oaks:

Although somewhat shorter-lived than white oak, the red oaks have a fine reputation for beauty and versatility, and the lumber is highly sought after. Red oak acorns mature in two years and tend to be bitter in taste. The bark is generally dark gray or brown, occasionally black. It is usually rough, hard, and ridged, rather than light gray, scaly, or flaky as in the white oaks. The pores of red oak are generally clear of tylosis, making the wood unusable for tight cooperage. Red oak is most important to the furniture, flooring, railroad tie, and pallet industries. See Table 2 for some important distinctions between white oak and red oak.

Table 2 — Distinguishing features of white and red oaks

White oak	Red oak
Acorns mature in one season.	Acorns mature in two years.
Leaflobes rounded.	Leaflobes bristle-tipped.
Color of heartwood tends to be tan or brownish.	Color of heartwood tends to be reddish.
Heartwood pores have abundant tyloses.	Heartwood pores have few tyloses.
Fresh-cut wood has a distinct, but not unpleasant, odor.	Fresh-cut wood has a sour, often unpleasant odor.
Summerwood pores are small and numerous. Cannot be counted with a hand lens.	Summerwood pores are few. Can be counted with a hand lens.
Annual rings usually are compact, resulting in a finer textured wood.	Annual rings usually are widely separated, resulting in a coarse, textured wood.
Heartwood is quite durable.	Heartwood is not particularly durable.

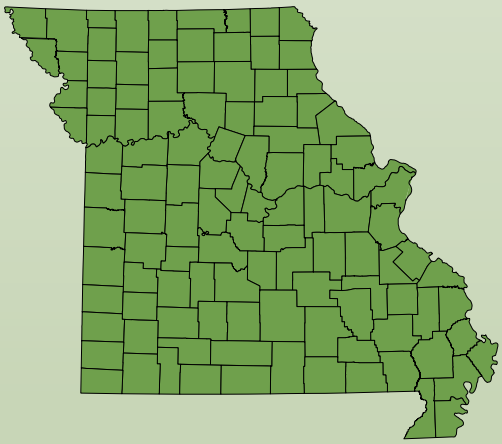
Red oak group

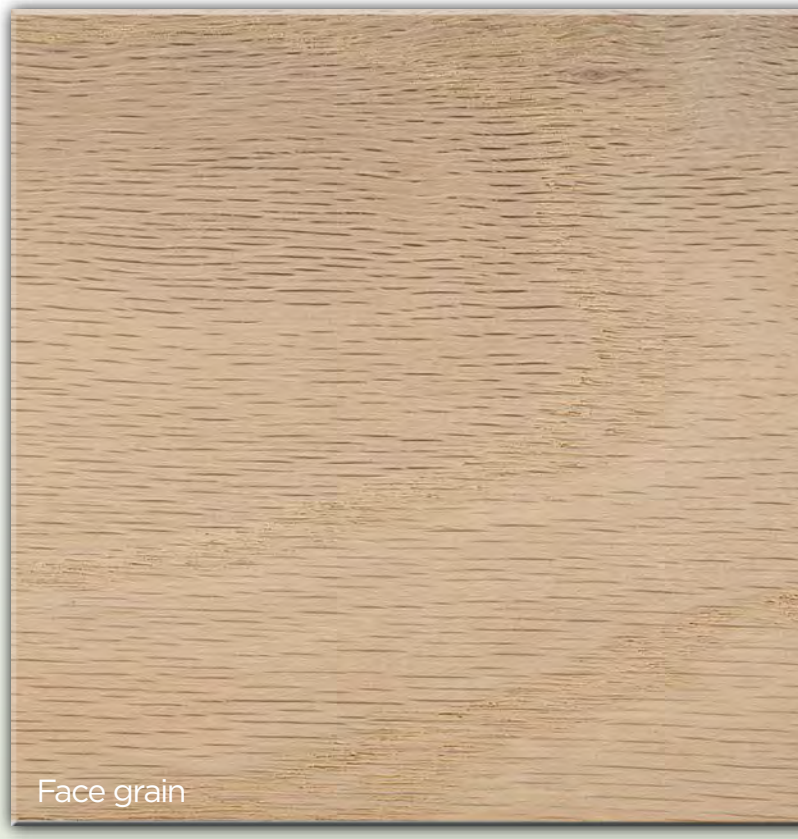
Quercus spp. (including black oaks)

Since all lumber from the red and black oaks is lumped together in commercial trade, I will call this the red oak group. It includes, but is not limited to, northern red oak (*Q. rubra*), pin oak (*Q. palustris*), scarlet oak (*Q. coccinea*), Shumard oak (*Q. shumardii*), black oak (*Q. velutina*), southern red oak (*Q. falcata*), cherrybark oak (*Q. pagoda*), blackjack oak (*Q. marilandica*), shingle oak (*Q. imbricaria*), and others. The red oaks grow throughout the state to various degrees, depending upon the site and species. They attain their best size and growth rate on medium textured, deep, moist soils, but some species such as blackjack oak are found on some of the poorest sites when considering soil texture, moisture, and depth.

Some of this group are commercially important, some are not. It is neither desirable nor practical to separate the red oaks by species once they are cut into lumber. The sapwood is generally creamy white, and the heartwood is reddish to light reddish brown. The wood is distinctly ring porous with large visible pores, hard, heavy, and strong. It is fairly easy to work. It has a characteristic sour odor when green, which becomes less distinct upon drying. Red oak is difficult to dry, but is very stable once the moisture is removed. The sanding and finishing qualities are excellent. The large pores in red oaks are hollow as compared to white oak, and the wood is not liquid-tight. Ray fleck is apparent.

The uses of red oak are too numerous to mention. Almost anything made of wood has at one time or another been made from red oak. It is most popular as a furniture wood, veneer, paneling, as molding and trim, in picture frames, flooring, railroad ties, farm lumber, pallets and crating, as well as charcoal. Its pleasant, uniform color, and grainy texture make it an excellent wood for home workshops, and it is commonly available.





White oak group

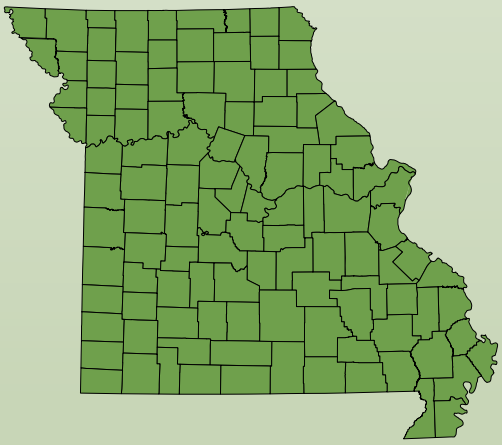
Quercus spp.

The white oak group includes, but is not limited to, white oak (*Q. alba*), bur oak (*Q. macrocarpa*), post oak (*Q. stellata*), overcup oak (*Q. lyrata*), swamp white oak (*Q. bicolor*), chinkapin oak (*Q. muehelnbergii*), and swamp chestnut oak (*Q. michauxii*).

The white oak is one of the most common trees found throughout Missouri. It grows best on rich, deep, moist (but well-drained) soils though it can be found on all sites. It may be found in pure stands or mixed with red oaks, hickories, elms, and sugar maples.

The sapwood of white oak is creamy white and the heartwood is light tan or brown. When freshly cut, the heartwood will often have a pink tinge. All white oaks have tyloses, which plug the vessels and pores. Not all white oaks are suitable for tight cooperage because some species have an abundance of pin knots, which are not tight. The wood is strongly ring porous with large pores. It is hard, heavy, strong, fairly easy to work, and machines well. White oak is difficult to dry. It honeycombs and checks freely if extreme care is not used. Once dry, however, it is quite stable. The sanding and finishing qualities are excellent. It may be used in many of the same products as red oak. It is usually more closely grained than red oak. Ray fleck is very apparent on the radial section.

White oak has a variety of uses. When considering uses for red or white oak, it is important to remember that in most cases either group will suffice except when the wood is exposed to decay, as in boat parts, and then only white oak should be used. Only white oak is acceptable for tight cooperage, not red oak. White oak is a fine wood for home workshops and is commercially available in quantities. It is especially good when strength and durability are desired.



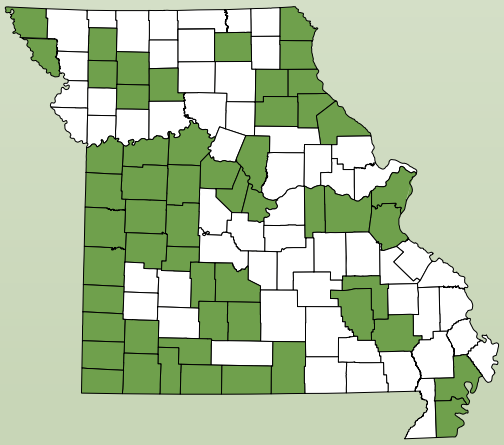
Osage orange

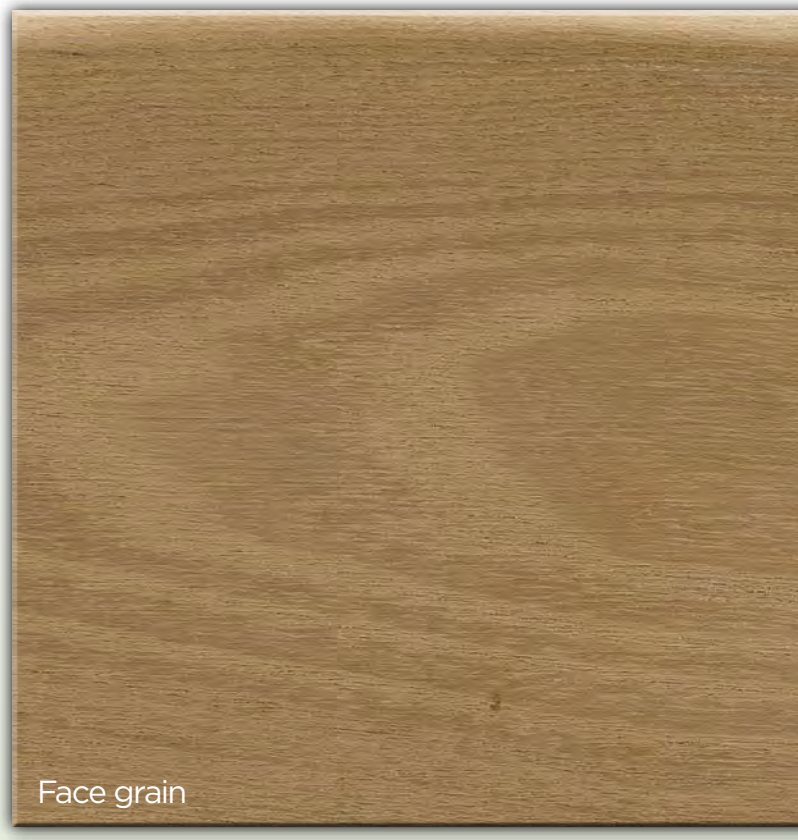
Maclura pomifera

Probably not a native tree to Missouri, the hedge tree, hedge apple, or *bois-d'arc*, as it is sometimes called, was planted extensively in the state for fencerows and for erosion control. It has escaped cultivation and is now found throughout the state, at least in most farming communities. It grows best on deep, rich soils, but will grow just about anywhere.

The sapwood is light yellow and usually fairly narrow. The heartwood is golden yellow to bright orange, darkening to a rich orange-brown upon exposure. The coloring matter is readily soluble in warm water. The bark is orange-brown, deeply furrowed, and somewhat shreddy. The wood may be confused with that of black locust, though black locust is not as yellow and has green and gray tinges. Growth rings are distinct, and the wood is ring porous. It is very hard, strong, stiff, and durable. The wood machines well and polishes to a high luster.

The source of most hedge, or Osage orange, lumber is from scattered logs usually cut from old fencerows. Thus, it is not common at local sawmills. The only commercial use made of this species was for archery bows, fence posts, and telephone pole insulator pins. Most of the archery use has since changed to fiberglass. It has a natural durability greater than any other wood. While not readily available, when properly dried it can be an interesting wood for crafts and novelty items for a home workshop.






Face grain


End grain


Edge grain


Bark

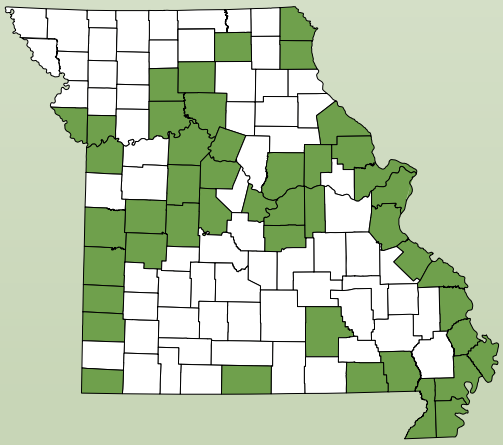
Pecan

Carya illinoinensis

Pecan is treated separately here from the true hickories listed elsewhere, although in wood form, all hickories are often mixed together. Pecan is common in the broad, flat riverbottoms of the Mississippi and Missouri rivers, as well as some of the major tributaries. It is found primarily on deep, moist soils, although it will grow on upland sites, too. Pecan is a favorite nut tree because of its sweet nutmeat. It is cultivated in both its native forms and in hybrids of many different types. On a good site, it becomes an immense tree.

The sapwood is creamy white to pale brown, the heartwood more pale brown to reddish brown, sometimes containing streaks of a slightly darker hue. Frequently, it will have mineral streaks and bird peck or streaks that look like worm tunnels. The bark is thick, light to dark brown and sometimes gray, and deeply and unevenly furrowed. The wood is semi-ring porous, though growth rings are distinct. The wood is close-grained, hard, very heavy, and strong. It machines well and finishes well, but shrinks quite a bit and has some stability problems after drying. It is not durable and is subject to attack by boring insects.

Its major use is in furniture and wall paneling because of its attractive color and grain. As with other hickories, it can be used for tool handles (especially impact tools), ladder rungs, flooring, and special products requiring a strong, tough, elastic wood. It has been used in smoking meats and as fuel wood. Pecan makes a beautiful shade tree and is commonly planted. The wood is difficult for the hobbyist to separate for shop use, but works like all other hickory species.



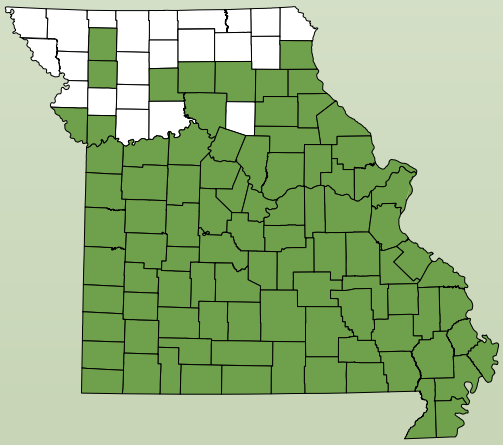
Persimmon

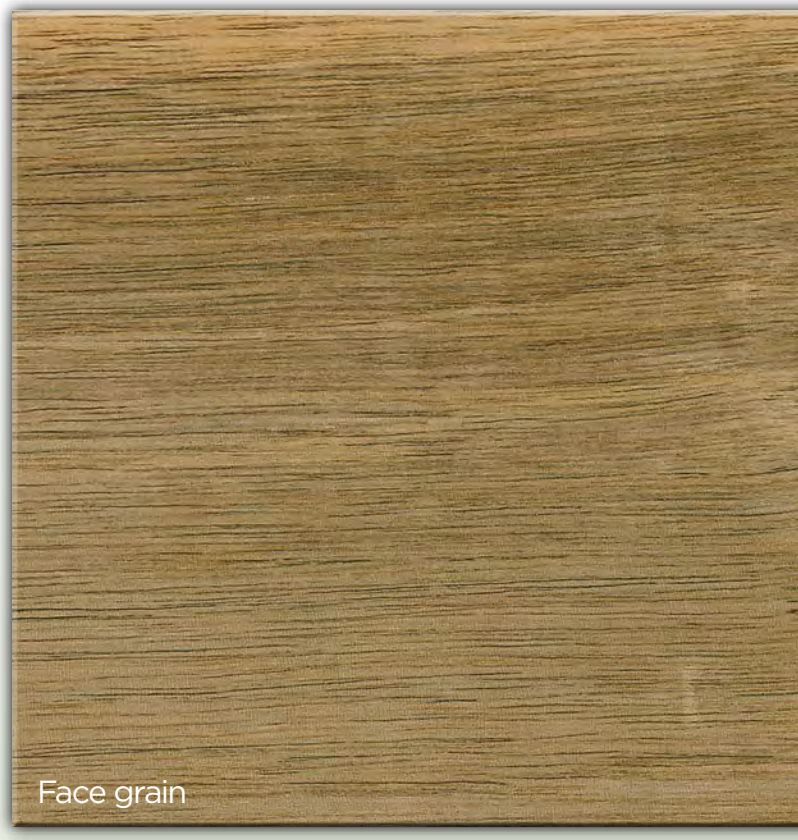
Diospyros virginiana

Persimmon, sometimes called possomwood, grows throughout the lower two-thirds of Missouri and is the only species of the ebony family found in the United States. It is an invader of old fields, but may be found as a scattered tree in forest habitats, particularly in rich bottomlands. It is frequently associated with red cedar and sassafras on drier sites where it is usually only a small tree.

The sapwood is creamy white and practically all commercial products made from persimmon are made from its sapwood. The small amount of heartwood is blackish brown to black, often streaked, and irregular in outline. The bark is thick, dark brown or black, and deeply divided into small square blocks. The wood is quite heavy, extremely hard, dense, and strong. In addition, when subjected to wear, it polishes to a very smooth surface. It is difficult to season, difficult to work with tools, but is fairly stable when dry. It is not at all resistant to decay and should never be used outdoors. Growth rings are distinct but not conspicuous, and the wood is semi-ring porous. It has an interlocking grain.

We seldom think of persimmon as lumber, yet for certain technical uses it is quite acceptable. It has been used for golf club heads and shuttles in the textile industry. Only the sapwood is used, because the tree is largely sapwood. Most of the commercial persimmon comes from the southern United States. A popular feature of this tree is its edible fruit. Many people enjoy the flavor of persimmons, which may be eaten directly from the tree. The fruit is also eaten by wildlife, notably opossums, foxes, raccoons, skunks, and deer. It is generally not used in home workshops because it is seldom available as lumber.






Face grain


End grain


Bark

River birch

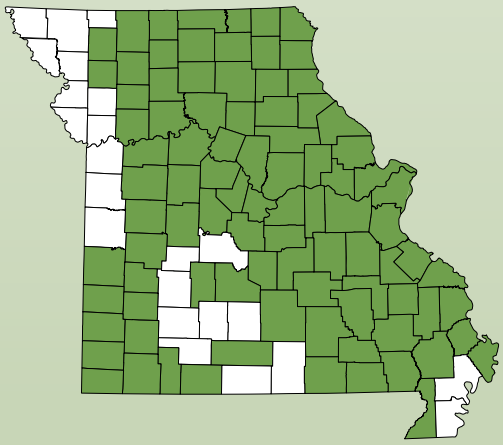
Betula nigra

River birch is the only native birch to Missouri and is sometimes called red birch, black birch, or water birch. It prefers rich, deep, and moist soils along rivers and streams and is also found on gravel bars. It is often associated with sycamore, willow, red and silver maple, and cottonwood. It grows naturally throughout the state except for a few of the western prairie counties and the dry upland areas of the southwestern Ozarks.

The bark is reddish brown, separating into large, thin, papery scales on young trees, but becomes thick and dark red-brown with deeply furrowed scales on older trees. The sapwood is whitish, pale yellow, or light reddish brown. The heartwood is light brown to tan or reddish brown. The wood has no distinguishing odor or taste. The heartwood has a characteristic dark or chocolate brown streaking, which looks like worms. These streaks are scattered and abundant in some wood, scarce in others. Similar streaks are found in soft maple, but are not nearly so abundant, and the maple wood is usually whiter.

River birch is common in Missouri, but not commercially important. Yellow birch (*B. alleghaniensis*), a northern cousin, is the birch most often found in lumber yards and as plywood. Overall, river birch is a moderately hard wood, strong, and easily machined. It shrinks considerably, but is fairly stable when dry. The wood is diffuse porous, and the growth rings are not very distinct without a hand lens.

River birch is found occasionally at sawmills, particularly those that saw bottomland species. The lumber is generally lumped together with soft maple. Birch is an excellent furniture wood. It is used for paneling, boxes, crates, novelties, and toys. Not commonly found in home workshops, it is a good wood for furniture projects because it machines, sands, and finishes well.



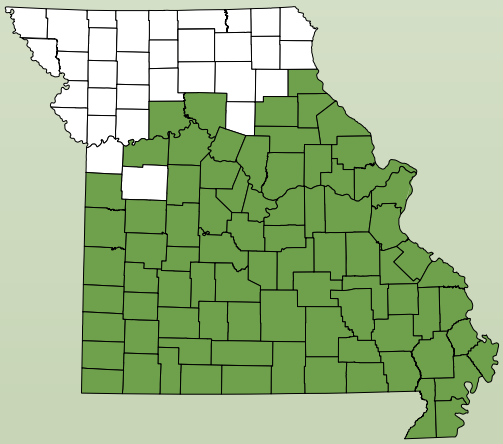
Sassafras

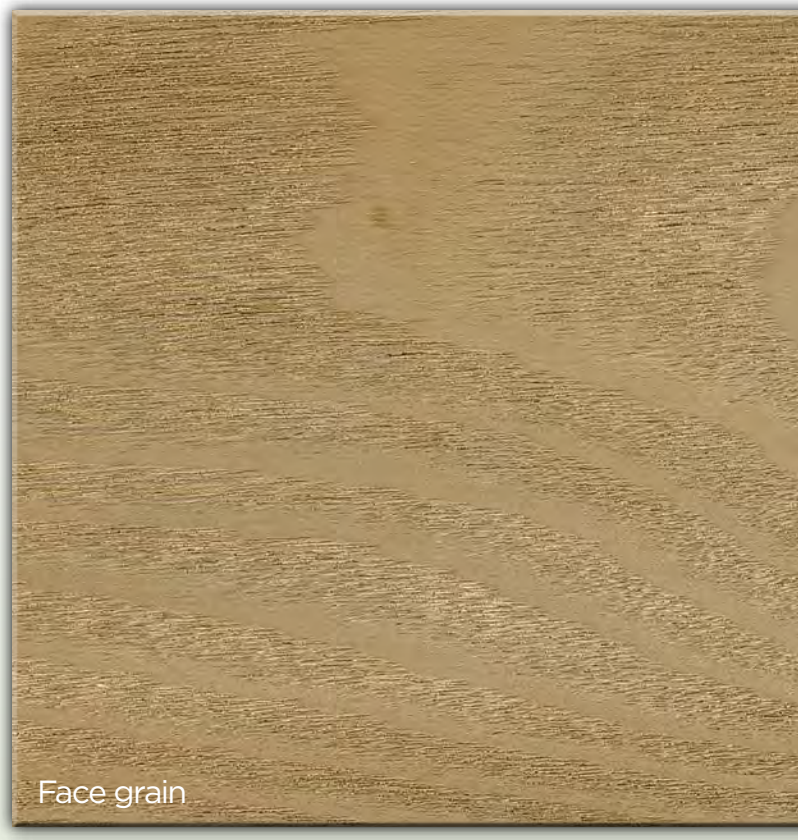
Sassafras albidium

Sassafras grows throughout the lower two-thirds of the state. A unique tree that is an invader of old fields and a pioneer along fencerows, it grows to a large timber size on deep, rich moist soils in coves. On these better sites, it can exceed 2 feet in diameter and 60 feet in height.

The sapwood is creamy white to light yellow and heartwood is a pale or dull grayish brown or orange-brown. The bark is gray to dark brown, thick, and deeply furrowed into large plates on older trees. On young trees, it is thin, gray to reddish brown, platy with a bright orange inner bark. The bright orange inner bark is an identifying feature. The grain pattern is somewhat similar to ash, though the wood is considerably softer. The odor of the oil of sassafras is apparent on freshly cut surfaces of the wood and bark, and the roots are harvested for commercial distillation of the oil of sassafras, which is used in tea, soap, perfumes, flavorings, and medicines. The wood is moderately hard, easy to dry, machines well, and is quite stable when dry. Growth rings are very distinct, the wood being ring porous. Tylosis in large pores is common and the wood is quite durable.

Common as a small tree, the large trees are usually so scattered or scarce that the species is never much of a factor in the lumber market. But to the cabinet maker, it is a beautiful and unique wood, filling a workshop with a sweet spicy smell as products such as paneling, furniture, novelties, toys, and canoe paddles are created. In the Ozarks, if someone gives you a sassafras canoe paddle, you know this person respects you and is your friend. However, do not try to buy a sassafras paddle from a friend, as it can only be a special gift.





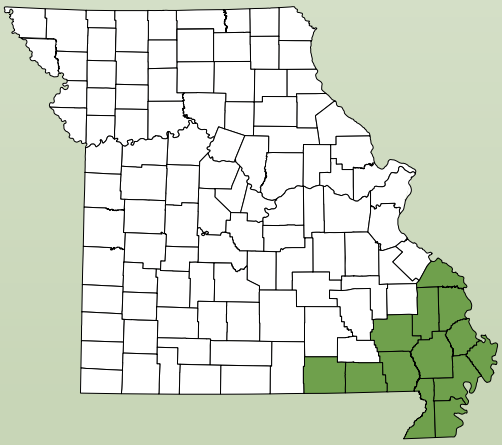
Sweet gum

Liquidambar styraciflua

Also known as red gum, southern gum, American sweet gum, and American red gum, this species may be sold as "sap gum" in the trade. Sweet gum grows in a limited range in the lowlands of the Bootheel. It grows best on deep, rich, moist soils, but will tolerate many poorer sites. It grows to a very large size on good sites.

The sapwood is a rather nondescript off-white color, frequently with a reddish tinge discolored with blue sap stain. The heartwood is reddish brown, with shades of gray and darker streaks of red or brown. The bark is light gray, smooth, and thin on young trees, becoming darker and furrowed into thick plates on older trees. The wood is moderately heavy, hard, straight, and close grained, usually with an interlocked grain, which is often figured. It machines well, slices into veneer well, and holds nails, screws, and glues satisfactorily. However, it has a tendency to twist and warp and requires considerable care in drying. The growth rings are inconspicuous and the wood is diffuse porous.

Sweet gum is an excellent lumber species and is one of the most important timber trees in the United States. It is used in a host of ways, including both rotary and vertically sliced veneer, lumber, and furniture stock. Its even texture allows it to be stained or painted easily. Sweet gum may be mixed with more valuable woods such as walnut. It is also used as paneling, boxes, crates and pallets, slack cooperage, mine props, railroad ties, and pulpwood. The availability in Missouri is mostly in the Bootheel area. When properly dried, it makes a good all-purpose wood for the home workshop.



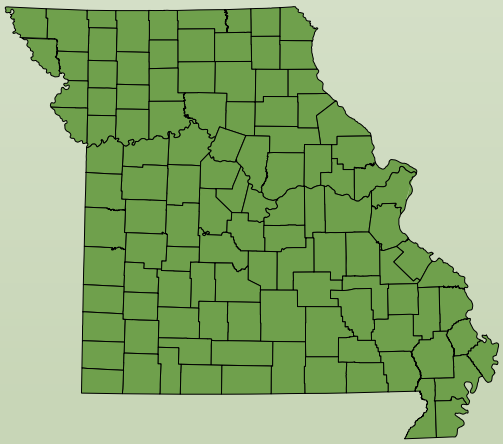
Sycamore

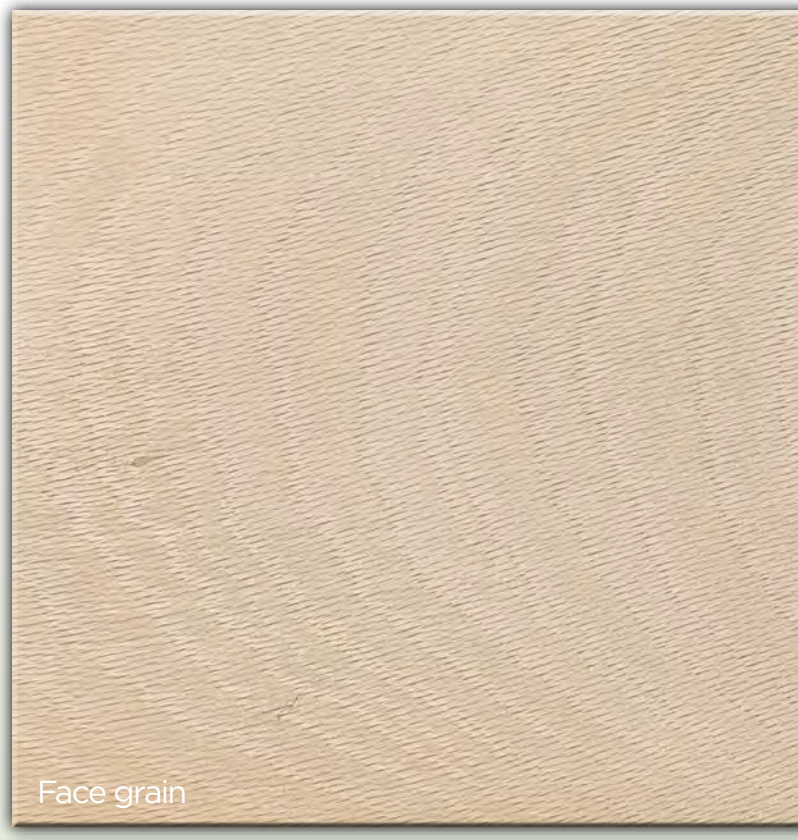
Platanus occidentalis

Sycamore is also called buttonwood, American planetree, buttonball tree, and American sycamore. It grows throughout Missouri on just about any site, but favors rich riverbottoms where it attains great size. It is the largest broadleaf tree in the United States and may be found mixed with river birch, elm, soft maple, box elder, black willow, and cottonwood, or in pure stands. It is often an invader of old fields.

The sapwood is light tan, creamy, or pinkish white, while the heartwood is flesh to brownish pink, or reddish brown. The bark on young trees is thin, smooth and whitish, peeling off in large flakes. On older trees, the lower bark becomes deeply furrowed and broken into small, round scales. The dry wood has no particular odor, but when green, it may have a decidedly rank odor. The growth rings are distinct and the wood diffuse porous with a close-grained but coarse texture. Ray fleck is very apparent on the radial section. Because of the interlocked grain, it is difficult to split and may chip unless high-speed tools are used to machine it. It is inclined to warp, and it may be bent easily after steaming. It is not durable when exposed to conditions favorable to decay. Quarter-sawn stock displays a small ray fleck that is very attractive.

Sycamore is one of our most important commercial trees. One of its principal uses is for drawer sides in chests. It is also used in butcher blocks, boxes and crates, paneling, furniture, pallets, slack cooperage, and is sliced into veneer, which is used for fruit and vegetable boxes. It has been used for gunstocks on inexpensive rifles. As a home workshop wood, sycamore is excellent if it is properly dried and kept that way. It is a tough, resilient wood.





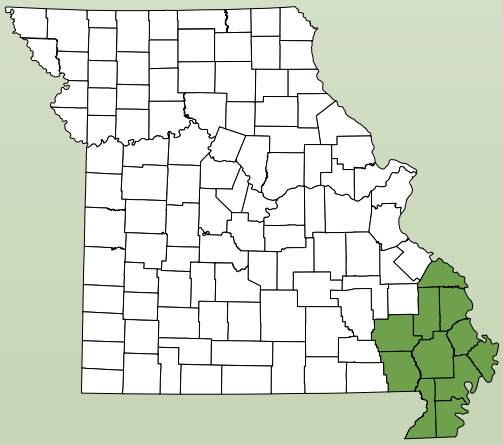
Tulip tree

Liriodendron tulipifera

Tulip tree is also known as yellow poplar, poplar, tulip poplar, and whitewood. The name whitewood comes from the thick band of white sapwood found in rapidly growing second-growth trees. Though known in the trade as yellow poplar, the tree is not a poplar at all, but is a member of the magnolia family. It grows in a few counties in the hills surrounding the Bootheel in southeast Missouri. Yellow poplar grows best on rich, deep, moist soils in the coves and valleys associated with northern red oak, black gum, ash, and basswood.

The sapwood is off-white to grayish white, while the heartwood is variable in color, ranging from clear yellow to tan, greenish brown, or olive-brown, and is frequently marked with shades of purple, dark green, blue, and black. The bark is gray to brown, thin, and smooth on young trees, becoming thick and deeply furrowed with long, narrow plates on older trees. The wood has no characteristic odor or taste when dry, but a sour smell when wet. Usually straight-grained, it is moderately light, not strong, but easy to machine and work. It glues well, and takes and holds paint exceptionally well. The growth rings are distinct, delineated by a whitish line of terminal cells. The wood is diffuse porous. It dries easily and is quite stable when dry.

The wood has been used for almost every conceivable purpose, limited only by sufficient strength for some items. It is used for furniture, interior trim and molding, boxes and crates, caskets, musical instruments, toys, woodenware, and veneer for berry boxes and plywood. Outstanding as an all-purpose wood for the home workshop, its use is only restricted by its limited range in Missouri, for only a few sawmills have it available.



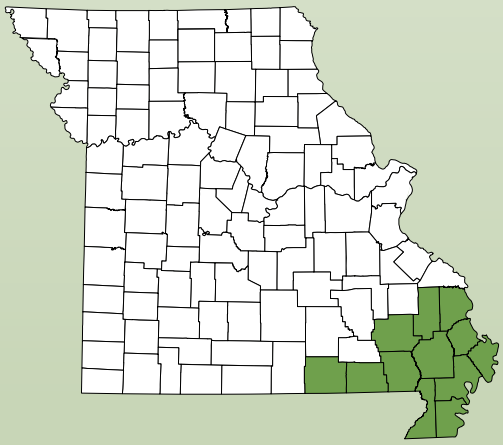
Water tupelo

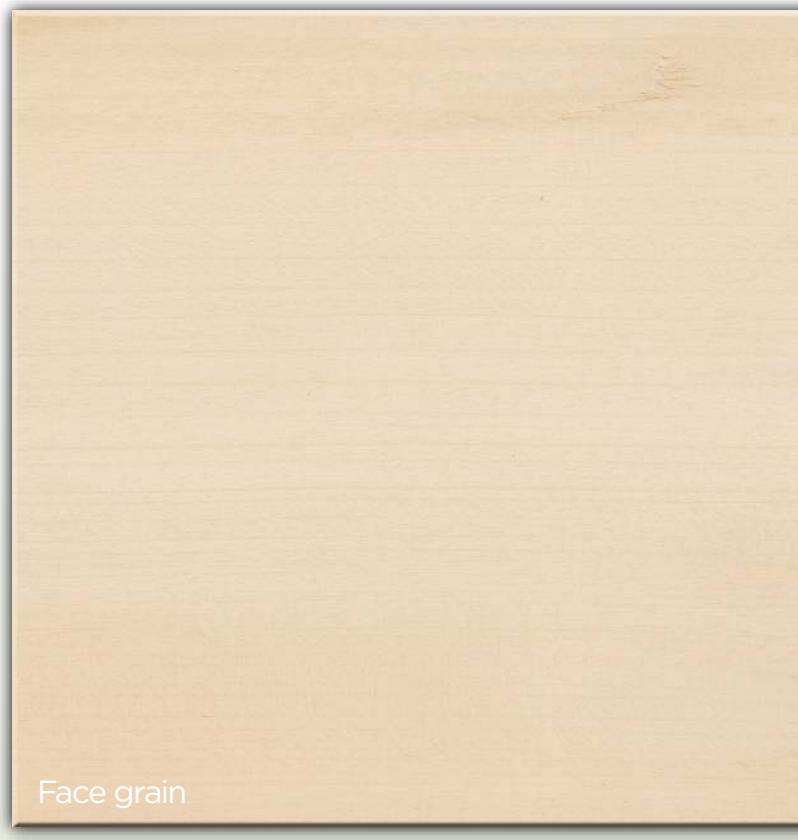
Nyssa aquatica

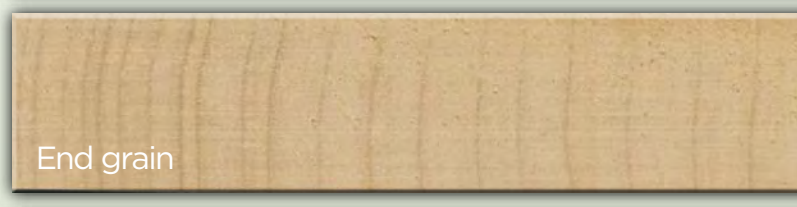
A Bootheel species, water tupelo, tupelo gum, sour gum, or tupelo grows in a limited range in southeast Missouri, mostly associated with extremely wet sites. In this habitat, it often develops a swollen butt on the trunk. On higher and drier sites, this swelling does not always occur. Commercially, black gum is frequently combined with it, but the mixture is still generally referred to as "tupelo." Swamp black gum (*Nyssa sylvatica* var. *biflora*) may also be included in this group.

The sapwood is nearly white to grayish white, merging into heartwood of greenish or brownish gray, or streaked with yellow and brown. The bark is dark brown, thin, and rough, with scaly ridges. The growth rings are generally indistinct even under a hand lens and the wood is diffuse porous. The woods of all the gums are so nearly alike that no attempt is made to separate them. The texture is fine with a uniform grain that is usually interlocked. It is moderately hard, strong, and difficult to split. The wood is average in machining, finishes well with paints, and glues satisfactorily. But it is difficult to dry and shrinks considerably with warping and twisting, and is not very stable.

The "tupelos" are used as veneer in berry boxes and similar containers. They have been used as slack cooperage, railroad ties, boxes, crates and pallets, in furniture (particularly for concealed parts), moldings and trim, woodenware, factory floors, and novelties. A wood of limited availability and difficult to dry, tupelo is not recommended for home workshop use.







Glossary

annual ring — annual increment of wood as it appears on a cross-section; same as growth ring

bark — the outermost cells on the stem, branches, and twigs of trees; these leathery, corky cells have two layers, outer and inner, which are more or less distinct

cooperage — in wood products, relates to wooden barrels, either liquid tight or slack; also see slack cooperage

cross-section — section of wood cut at right angles to the grain

cupping — warping of the face of a board so that it assumes a troughlike shape

density of wood — the mass of wood per unit of volume

diffuse-porous wood — porous wood in which the pores exhibit little or no variation in size, indicative of seasonal growth; also see ring-porous wood

discontinuous growth ring — growth ring formed on only one side of the stem

durability — the ability of wood to withstand wood-destroying fungi when exposed to conditions favorable to decay; prime consideration in the use of wood in some situations

earlywood — that portion of an annual ring produced at the beginning of the growing season, i.e., springwood

figure — generally, any design or distinctive markings on the longitudinal surfaces of wood; specifically, any designs in wood that are prized in use of the wood

flat-sawn — said of wood cut so that the tangential face is exposed on the surfaces of boards; plain-sawn

furrowed — marked with longitudinal grooves

grain of wood — arrangement and direction of wood elements when considered en masse

growth ring — ring of wood on cross-section resulting from periodic growth; called an annual ring when only one growth ring is formed during a year

hardwood — wood produced by broad-leaved trees such as oak, elm, and ash; same as porous wood

heartwood — dead inner core of a woody stem (or log) generally distinguishable from the outer portion (sapwood) by its darker color; see sapwood

honeycombing — internal splitting in wood that develops in drying; caused by internal stresses or by closing of surface checks

interlocked grain — grain in which the direction of the fiber alignment alternates at intervals, resulting in ribbon figure when wood is quarter-sawn; makes wood very difficult to split

latewood — the portion of an annual increment that is produced during the latter part of the growing season (during the summer); summerwood; also see earlywood

mineral stain — olive and greenish-black streaks believed to designate areas of abnormal concentration of mineral matter; common in hard maple, hickory, and basswood; also called mineral streak

moisture content of wood — the weight of the moisture in wood, expressed as a percentage of its ovendry weight

multiple ring — a growth ring that contains several false rings within its boundaries

nonporous wood — wood devoid of pores (vessels); same as softwood or coniferous wood

plain-sawn — said of wood cut so that the tangential face of the wood is exposed on the surface of the boards; same as flat-sawn

pore — cross-section of a vessel; a vessel as it appears on the cross-section of wood

porous wood — wood containing pores (vessels); same as hardwood, i.e., wood produced by broad-leaved trees

quarter-sawn — said of wood cut so that the radial face of the wood is exposed on the surface of boards

ray — ribbon-shaped strand of tissue extending in a radial direction across the grain, so oriented that the face of the ribbon is exposed as fleck on quarter surface; see wood ray

ray fleck — a distinct "spotting" created by a portion of a ray as it appears on either the radial or tangential surfaces

ring-porous wood — porous wood in which the pores formed at the beginning of the growing season (in the springwood) are much larger than those farther out in the ring, particularly if the

transition from one to the other type is more or less abrupt; see diffuse-porous wood

ring shake — rupture in wood that occurs between increments or less frequently within an annual growth layer; sometimes called wind shake.

rotary-cut veneer — veneer obtained by rotating a log against a cutting knife in such a way that a continuous sheet of veneer is unrolled spirally from the log

sap stains (blue stain) — stains in the sapwood caused by woodstaining fungi or by the oxidation of compounds present in the living cells, usually blue or black in color

sapwood — outer (younger) portion of a woody stem (or log), usually distinguishable from the core (heartwood) by its lighter color; see heartwood

seasonal increment — layer of wood laid down during a given year; see annual growth

semi-diffuse porous wood (semi-ring porous) — wood intermediate between diffuse-porous and ring-porous wood

shake — rupture of cells or between cells, generally parallel to the growth rings, resulting in the formation of an opening in the grain of the wood

slack cooperage — barrels made for shipment of coarse materials such as nails, nuts, bolts, railroad spikes, etc.; with a plastic or paper lining may be used for salt, sugar, or other granular products; called slack to denote that it is not used for liquids of any type.

softwood — wood produced by coniferous trees; same as non-porous wood

springwood — that portion of an annual increment produced at the beginning of the growing season (in the spring); the inner portion of a growth ring; see summerwood

staves — curved wood boards joined in circular fashion to form a barrel

straight grain — grain in which the direction of the fiber alignment is straight or nearly so; grain in which the fiber alignment is vertical or nearly so in the standing tree

summerwood — that portion of an annual increment or annual ring produced during the latter part of the growing season (during summer); the outer portion of a growth ring; see springwood

texture of wood — expression that refers to the size and the proportional amounts of woody elements; in the hardwoods, the tangential diameters and numbers of vessels and rays; expressed as coarse, fine, medium, or perhaps grainy

tight cooperage — a term denoting the liquid tightness of wooden barrels. Most commonly applied to whiskey barrels, but also includes pickle and salt pork barrels. Barrels of wood are made with vertical wooden staves held together with metal or wooden hoops.

twisting — warping in which one corner of a piece of wood twists out of the plane of the other three

tyloses (plural) — clear, saclike, or cyst-like structures that sometimes develop in a vessel, appearing plastic-like, and effectively blocking the passage of liquids; tylosis (singular)

vessel — composite, tubelike structure found in porous wood, appearing as a large hole or opening on the cross-section; see also pore

warping — any distortion in a piece of wood from its true plane that may occur in seasoning

wood ray — strips of cells extending radially within a tree and varying in heights from a few cells to an inch or more in oak

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F00051 11/2016