

AGRICULTURAL GUIDE

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Tree Seedlings

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Before you order tree seedlings

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Good planting practices include good planting stock, a well selected and properly prepared site, proper planting methods, and adequate protection and care after planting. Failure in any or all of these planting practices usually results in unsatisfactory survival or growth or even in complete failure.

Before you order seedlings, ask yourself:

- Will trees grow well in my area?
- What species is best for my planting purpose?
- Will this species grow on my soil?
- How many trees can I plant and properly care for?
- How and when do I order my trees?

This guide helps answer these questions. If planning a large planting or a commercial planting, seek advice from a professional forester. Contact the University Extension center in your county or the State Forester, Missouri Department of Conservation, Jefferson City, for further information.

Will trees grow well in my area?

Missouri is part of the great central hardwood forest region. More than 160 species of trees are found in the state. Trees preferring similar conditions form forest communities.

Soils and climate create four broad tree growing areas in the state. These areas, shown in Figure 1, denote major changes in general tree growing conditions that should be considered when selecting species. However, within each major area many varying sites must be considered individually for species selection.

Ozark area (A). A high priority area for tree planting. Extensive planting for commercial timber production is feasible in this area. Often little or no site preparation is needed before planting openings. It may be necessary to eliminate or control sprouts and other woody growth.

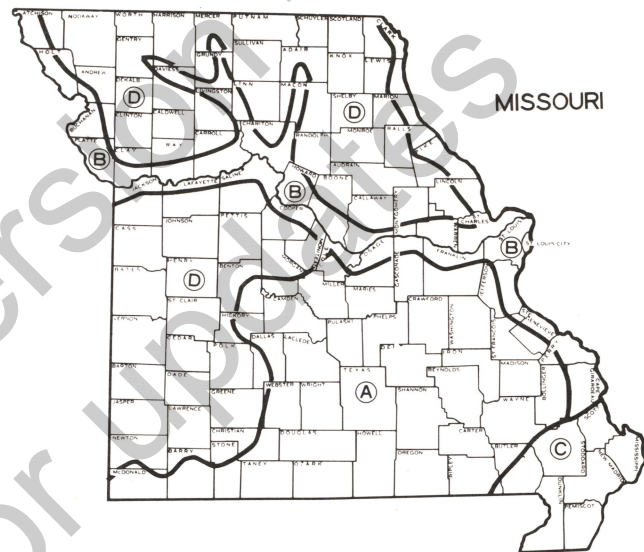


Figure 1. State tree growing areas.

River-Border area (B). Also a high priority area for planting, with many good sites for production of high quality hardwood species. It is essential to prepare the sites well before planting — especially the bottomlands. Follow planting with regular cultivation or mowing. Otherwise, survival and growth will be poor due to the rank weed growth which is common in this area.

Southeast Lowlands area (C). Planting of certain species on the overflow land in this area is feasible. Bulldozing or other site preparation is essential. Low grasses may be beneficial, but weedy sites must be cultivated or mowed regularly until trees are established.

Northern and Western Prairie areas (D). In general the soils and climatic conditions of these areas are not as favorable for tree growth. Site and species selection are extremely important. Prepare sites thoroughly and take extra precautions to prevent insect and disease outbreaks. After-planting care needs extra emphasis. However, many sites in the area are favorable for many species. Wildlife food and cover plantings are moderately successful and much needed.

TREE OR SHRUB	Wood Products	Wild-life	Wind-breaks	Erosion Control	Ornamental or Shade
Aromatic sumac		X		X	
Autumn olive		X	X	X	X
Bald cypress	X			X	X
Black locust	X(Fence Posts)			X	
Black walnut	X	X			
Bur oak	X	X			X
Cherry Bark Oak	X	X			
Cottonwood	X(Strip Mines, Stream Banks)			X	
Deciduous Holly		X	X		X
Dogwood		X			X
European black alder		X	X	X	X
Gray Dogwood		X			X
Green Ash	X		X	X	X
Hackberry	X	X	X		X
Hazelnut		X	X		X
Jack pine		X	X	X	
Ninebark		(Cover)			
Northern red oak		X			X
Nuttall Oak	X	X			X
Osage orange	X	X	X	X	
Pecan	X	X		X(Strip Mines)	X
Persimmon		X			
Pin oak		X	X		X
Redbud			X	X	X
Redcedar	X	X	X	X	X
River birch		(Cover)			
Scotch pine	X(Christmas Tr.)	X	X		X
Shortleaf pine	X	(Cover)		X	
Silver maple				(Ozarks)	
Sweet gum	X		X(Boot-heel)		X
Sycamore	X			X(Stream Banks)	X
White ash	X	X	X		X
White oak	X	X	X		X
White pine	X		X		X
Wild plum		X		X	
Yellow poplar	X				X

Table 1. Primary uses of major species.

What species is best for my needs?

All trees have their uses. Uses include wood products, shade or ornamental beauty, food and shelter for birds and animals, protection of soil, and modification of temperature or noise levels. All trees filter the air and produce oxygen. Table 1 lists some of the primary uses made of some of the major species planted in Missouri.

There are a number of excellent references for further information on trees listed here. *Trees of Missouri* by Settergren and McDermott with photographs by Tau is an excellent local text. Published by the University of Missouri, it is available for \$5.00 from Extension Publications, 115 South 5th, University of Missouri-Columbia, Columbia, MO 65211. University extension centers in each county also carry copies. Other UMC Guides on selecting trees are: 6800, 6805, 6810, 6815, 6820, and 6830.

Trees of Missouri

Aromatic sumac. A shrub up to 6 feet in height found throughout Missouri except the extreme northwestern and southeastern portions of the state. Fruit is red in

color, ripening from June through August and is eaten by many birds including wild turkey.

Autumn olive. People who want to attract wildlife, conserve soil, beautify odd areas, establish plant barriers, or make ornamental plantings find autumn olive a valuable plant. Thickets or rows of fully grown autumn olive furnish good protective cover for both birds and mammals. As a producer of food for such birds as quail, grouse, dove, pheasant, turkey and many songbirds, autumn olive is outstanding. Its silvery green foliage and red berries are attractive to the eye.

Autumn olive grows well on deep, sandy, loamy and moderately clayey soils that are at least moderately well drained. It does less well on very dry soil and often fails on very shallow, poorly drained or excessively wet soils. High fertility is not required. Spreading has been noted on sand blows, strip mines and a few other unmanaged areas. May be planted statewide.

Bald cypress. Occurs naturally in deep swamps in area C which are usually flooded for long periods of time. It is a tree of considerable beauty and has been planted as an ornamental tree statewide on a variety of sites. In old age, the tree generally has a broad fluted or buttressed base, a smooth slowly tapering trunk and a broad, flat top. Its bark is cinnamon-red, and the leaves are small and arranged in feather-like fashion along two sides of small branchlets. The branchlets fall in the autumn with the leaves still attached. The wood is very durable.

Black locust. It has fragrant white or cream-colored flowers and has very hard, strong, durable wood. Its primary uses are for posts, erosion control, fuel wood and — because it is a legume with fibrous roots — soil improvement. Its branches are armed with pairs of short, sharp spines. Because it spreads easily from root runners, it can become a nuisance. On poor soils it is usually attacked by locust borers. Is found in areas A, B and D but does best on fertile, moist soils of limestone origin.

Black walnut. On an individual tree basis, black walnut is the most valuable commercial species in the United States. Its wood is prized for a great variety of uses, including furniture, gunstocks and veneers. Its fruit, a nut, also provides many products and is a staple diet for squirrels.

Walnut is found statewide, but it is typically a good-site tree and develops best on deep, well-drained, moist and fertile soils. This species is common on limestone soils and does especially well on deep loams, loess soil and fertile alluvial deposits. On wet bottomland or dry ridges and slopes, it grows slowly. Under natural conditions abundant seed crops are produced irregularly, perhaps twice in five years. It commonly invades abandoned fields and pastures. Grasses thrive under its light shade. If nut production is desired, wide spacings are necessary.

Bur Oak. A large oak found naturally on fertile, well-drained soils statewide. The acorn is large, up to 1½ inches in diameter and ½ to ¾ enclosed in a fringed cap. The bark is thick, almost corky, insulating the tree from fire. The wood is used like white oak for lumber, barrel staves, fuelwood, railroad ties, etc.

Cherry Bark Oak. This is a large oak of the Southeast Lowlands area of the state. Its name is derived from the scaly, reddish-tinged bark's resemblance to the bark of black cherry. It is probably one of the most preferred for timber quality of the lowland red oaks. A forester should be consulted before undertaking any extensive planting of this species outside of area C.

Cottonwood. Found along streams throughout the state, it is a large, spreading tree with shiny, triangular leaves which turn yellow in the fall. Female trees produce large quantities of cotton-like seeds. It is sometimes used as an ornamental where large spaces exist because it grows rapidly and requires minimum care. It does become large and brittle and is relatively short lived. Its roots can damage basements, pavements and drainage lines.

Cottonwood develops best in deep, silty, sandy or clay-loam soils that are moist but well-aerated. It will survive deep sedimentation.

Deciduous Holly. Also known as Possum Haw, this small tree occurs on a variety of sites in areas B and C and southern portions of area A. The male and female flowers are borne on separate plants and the bright red berries on the females are a striking bit of color on the winter landscape. The fruit is also favored by a wide variety of birds which in conjunction with its site adaptability makes this plant a desirable for wildlife and ornamental plantings statewide.

Dogwood. Missouri's "state tree" is conspicuous in the early spring by its large, showy, white, petal-like bracts which give the appearance of large spreading flowers. The fruit, a scarlet drupe, is relished by birds, squirrels and other animals.

Dogwood is a small tree commonly found in the understory of a woodland. It is shade tolerant, and although found naturally south of the Missouri River, it can be grown statewide on selected sites. It will tolerate neither flooding nor droughty situations.

European black alder. Imported from Europe for use in producing charcoal, it reaches a height of about 50 feet, making its best development on moist sites. Because of its rapid growth and adaptability to many growing conditions, black alder has been used successfully to reclaim strip mined land. The fruits — catkins — resemble tiny pine cones and stay on the tree all winter.

Gray Dogwood. A small almost shrub-like dogwood that does well on a wide variety of sites from rocky upland glades to moist prairie areas statewide. Gray dogwood forms thickets by underground suckers. The foliage takes on a purplish hue in autumn with

clusters of white fruit borne on red stems, giving this species ornamental as well as wildlife food and cover value.

Green ash. Often planted as a shade tree, it is rapid in growth. Green ash is a moderately large tree distributed throughout the state. A bottomland species, it is, however, tolerant of many site conditions. Its wood is inferior to white ash but is used for many of the same purposes in the lumber industry.

Hackberry. One of our most common species, hackberry is closely related to the elms. Its bark is grayish in color, rough, with unique warty projections. In rich bottomlands, where it is more commonly found, it may grow to 125 feet in height.

It often hosts a disease which causes profuse clumps of twig growth called "witches brooms" and hosts several species of gall-forming insects. Still, many people consider hackberry a desirable shade tree. It is tolerant of the growing conditions found in urban communities. The galls and the fleshy, purple, berry-like fruit furnish food for squirrels and birds.

Hazelnut. A medium to large shrub that occurs in thickets on a wide variety of sites statewide. The nuts which are also known as Filberts are a favorite of a wide range of wildlife from blue jays to deer as well as people. The nuts are often consumed by wildlife before fully mature. The foliage of this species can be quite attractive in the autumn.

Jack pine. Small to medium, short-lived tree. Jack pine has a wide spreading and moderately deep root system. It is planted statewide for erosion control because of its hardiness and tolerance to adverse sites. Has some use as a Christmas tree species. It grows fast in its early life and makes a quick ground cover. Its branches have a crooked-twisted appearance. It requires plenty of light and is susceptible to sawflies and tip moth.

Ninebark. This large shrub has small, white flowers in umbrella-like clusters. Fruit small dry bladder. Bark on older branches is papery and shredded. Yellow-green autumn foliage. Tolerant of many soils and thrives in semi-shade as well as in the sun. Best used in the background of a shrub border or for an unclipped hedge.

Northern red oak. Is found statewide, commonly on shallow, rocky soils, although it prefers well-drained loam or clay-loam sites. It is found most frequently on northerly and easterly aspects, lower and middle slopes, coves and ravines and valley floors. Its acorn crops are important food for squirrel, deer, turkey and other birds and animals. It is an important timber product species. The brilliant red color of its autumn leaves and its symmetrical form have made it a widely used shade tree where space is not limited.

Nuttall Oak. An oak of the low, wet lowlands of Southeastern Missouri. Nuttall Oak somewhat resembles pin oak in general appearance but has significantly larger acorns. It also grows very well on sites

too wet and poorly drained for pin oak. It is a relatively fast growing species and can obtain heights of up to 120 feet. A forester should be consulted before undertaking extensive plantings of this species on other than poorly drained sites in area C.

Osage orange. Although probably not native to Missouri, Osage orange has become naturalized through its use in fence row plantings. It is found most commonly on deep, rich soil but in Missouri grows on a variety of soils. It is extremely hardy and durable, making it suitable for fence posts. It is useful for farm windbreaks, wildlife cover and erosion control. Its shallow root system competes efficiently for available moisture with other plants.

Pecan. A favorite nut, timber and shade tree of Missouri. It occurs naturally in areas along certain large streams and rivers throughout the state. It is most common on well-drained loam soils not subject to prolonged overflow, such as first-bottom alluvial soils. It also occurs on certain heavy-textured bottomland soils and some cool, protected slopes. Nut production in native pecan begins when trees are about 20 years of age, with optimum seed bearing age from 75 to 200 years. Pecan trees often attain large sizes.

Persimmon. A common old-field invader, this hardy tree is related to the tropical ebony tree but has no close relatives anywhere in this country. On poor sites it is a small to medium-sized tree but on bottomland soils can grow rather tall. Fruit is a large, fleshy orange berry about 1 to 1½ inches in diameter. It is edible and highly sought by many species of wildlife.

Pin oak. Is a wet-land tree, growing in the bottomlands and borders of swamps, but also occurring on poorly-drained prairie soils, and in fence rows and along draws in nearly every county of the state. Because it is one of the fastest growing oaks and will survive on a variety of soils, it is used extensively as a windbreak and ornamental tree. Pin oak has a single, upright stem with numerous long, tough branches, the lower ones drooping, the middle horizontal and the upper ascending. It produces very knotty, low-grade lumber.

Redbud. A small tree occurring under taller trees or on the borders of fields, on hillsides or in valleys throughout the state. Its stout branches usually form a wide, flat top. The conspicuous, bright purplish-red, pea-shaped flowers are numerous and colorful in the very early spring. These flowers and the heart-shaped leaves make redbud desirable for ornamental planting. Its diameter seldom exceeds 8 inches or its height 25 feet.

Redcedar. One of the most versatile trees in Missouri, it is found in every county in the state on nearly all classes and conditions of soil. It seems to thrive on barren soils where few other trees are found. It is relatively slow growing on most sites and generally a medium-sized tree. Its heartwood is red, durable and aromatic and is used in cedar chests, closets and

novelty items. Its dense evergreen foliage makes it a valuable windbreak, screen or hedge tree. The fruit is pale blue, berry-like and a favorite winter food for birds. They tend to scatter the seeds widely, causing invasion of the tree into pastures and other areas where it may not be wanted.

It has a few fatal insect and disease enemies but does host bagworm, spider mites and cedar-apple rust. It is also susceptible to damage by even light fires.

River birch. The only birch native to Missouri, it is a common lowland and riverbank species. It is a medium-sized tree commonly found in clumps of several trunks. The bark is thin and papery and light pinkish or tan in color.

Scotch pine. Not native to the state, but planted widely for Christmas trees, windbreaks and ornaments. Has cinnamon-colored bark and is a medium to large tree. Scotch pine is very hardy and grows well on many soils, especially in its early life. Later growth is best on deeper, well-drained soils. Needle length, color and disease susceptibility vary greatly with seed sources. It is susceptible to tip moth, needle blight and field mouse damage. If planted for Christmas trees, it must be sheared after the third or fourth year until harvest.

The Department of Conservation Nursery offers Scotch pine from a French seed source and from a Belgian seed source. The major differences between the two are the Belgian is a longer needled, somewhat faster growing variety and exhibits somewhat greater resistance to some of the common needle diseases such as Brown Spot. As a Christmas tree, however, it takes on a severe yellowish tinge in the winter, making artificial coloring almost mandatory. The French variety, on the other hand, retains a deep almost blue-green color throughout the year.

Shortleaf pine. The only pine native to Missouri. Its natural range lies in area A, for the most part on thin upland slopes or ridgetop soils of sandstone origin. It is an important timber species, used largely for lumber, paper-pulp, and treated posts. Scattered stands of young shortleaf pine furnish valuable wildlife cover. When planted out of its natural range, susceptibility to insects and disease increases. In many cases, larger areas may be seeded, under a forester's direction, more economically than they can be planted. Shortleaf pine should be planted south of the Missouri River but only on selected sites in area C or D. Avoid shaded locations and claypan soils.

Shrub lespedesa. A perennial, woody shrub legume furnishing high quality quail and bird food. Rabbits will browse the plants during the winter, but the plant will sprout back the next spring. Plants mature at about 10 feet in height. Plants should be set 2 feet apart within the row with rows 3 feet apart.

Silver (soft) maple. Grows on a wide variety of soils but occurs naturally where there is a good moisture

supply throughout the growing season — usually on alluvial soils or soils with imperfect drainage. Silver maple grows rapidly and has been much planted as a shade tree. It has a disadvantage of brittle limbs subject to wind and ice breakage. Also several insects and diseases cause problems. Its silvery leaves turn yellow in the fall.

Silver maple is used for timber products, wind-breaks and streambank protection. May be planted statewide.

Sweetgum. A timber species whose natural range in Missouri is on rich river bottoms, in swamps subject to frequent overflows, and on drier uplands along streams in area C. However, sweetgum adapts to many soils and sites and has been planted statewide for many purposes. It is resistant to insects and disease but susceptible to fire.

It is a popular ornamental tree because of its adaptability, its star-shaped leaf (ranging in fall color from pale yellow to deep bronze) and its ball-like fruit which persists through the winter. Sweetgum is also tolerant of city environments.

Sycamore. One of the fastest growing trees, it attains large size and is found statewide. It has large leaves and distinctive variegated bark attractive in winter and summer. Its outer bark yearly flakes off in large patches, exposing the nearly white underbark. Because of its high resistance to industrial fumes it has been used extensively for shade tree plantings where space permits. It is commonly found along streams and in rich bottomlands but does not appear where surface drainage immediately around the tree is poor. It is highly susceptible to anthracnose and canker. Low-value timber products are produced from sycamore.

White ash. A tall, stately tree which makes its best growth on deep moist soils. It is often planted extensively as a park and shade tree. The wood is used for boat oars, baseball bats, furniture and interior finishes. The leaves turn yellow or purple in the fall.

White oak. One of the most common and best-loved Missouri trees. A large tree, it grows best on loamy, well-drained soils in protected coves and on cool slopes, but it is found on a wide variety of sites. White oak wood is used in barrels, furniture, and a number of other products. Although it is difficult to transplant, it becomes a large shade tree once established. Its leaves turn red in the fall.

White pine. A major timber species in much of the United States but introduced in Missouri as an ornamental. It is a large, long-lived, symmetrical tree with delicate five-needled foliage. White pine is sometimes used for Christmas trees.

White pine is more tolerant of shade and moist sites than many other pine. It is susceptible to air pollution, bagworm, winter injury and deer browsing.

Wild (American) plum. A small tree commonly occur-

ring in thickets throughout the state. An excellent wildlife cover and erosion control plant when planted in the heads of washes in region D.

Yellow (tulip) poplar. Receives its name from the yellow color of its heartwood and its attractive tulip-like flowers. It is native to deep, moist soils along streams and to cool north slopes in area C. Best growth is on soils with deep, well-drained surface layers, overlying loamy or moderately fine-textured subsoils with a good supply of available moisture. It should not be planted on flat-lying, poorly-drained soils with shallow depth to tight subsoils. Deep, fertile, moist soils in second bottoms, north slopes and coves in areas C, B and A are best planting opportunities.

Where space permits, yellow poplar is often planted as a shade tree or ornamental. Its leaves turn yellow in the fall. It is unusually free from serious insect or disease problems but is easily damaged by ice, cattle and wildlife.

Will this species grow on my soil?

Make note of soil type and present ground cover. Most trees and shrubs available for planting have definite soil, moisture and light requirements for best growth. Take special note of soils that have shallow impervious layers (such as claypans) or soils that are poorly drained. Trees differ greatly in soil moisture requirements, but few trees can stand poor drainage. If drainage is poor in the top 18 inches of soil, expect poor growth and even death of most species.

Poor soil drainage can sometimes be predicted from soil maps but usually is determined at the proposed planting site. Dig small holes (or use a soil auger) 18 inches deep throughout the field. Yellow, brown, or red soil is usually well drained. Soil that is gray or "wet-looking," or where water seeps into the hole is poorly drained. Poor drainage is also indicated by a clay hardpan or subsoil often spotted ("mottled") with bright colors at depths less than 18 inches.

How many trees can I plant and properly maintain?

Determine the total area to be planted to trees and how much time and funds can be spent on tree planting and maintenance each year. If a large number of trees is to be planted, determine if a tree planting machine can be used or if the trees must be planted by hand. Two men can plant about 800 trees in open agricultural land in an eight-hour day. An experienced three-man crew, operating a tractor and mechanical tree planter, can plant 1,000 trees an hour under the same ground conditions. (See UMC Guide 5009.)

If a tree planter can be used and is desired, consult your area district forester, University Extension cen-

ter, or soil conservation district for information on the availability of a planting machine.

The number of trees required per acre at different spacings are:

$6 \times 6 = 1,210$	$10 \times 10 = 436$
$7 \times 7 = 889$	$12 \times 12 = 302$
$8 \times 8 = 681$	$15 \times 15 = 194$
$9 \times 9 = 538$	$20 \times 20 = 108$

How and when do I order my trees?

Several private nurseries carry seedling trees and shrubs for conservation plantings. A partial list of these nurseries may be obtained by writing: Extension forester, The School of Natural Resources, Agriculture Building, University of Missouri-Columbia, Columbia, MO 65211.

Persons interested in purchasing trees and shrubs from the state nursery should contact their University Extension center, or write to: State Forester, Missouri Department of Conservation, Jefferson City, MO

65101. Either agency will provide a list of the seedlings available and a nursery stock application form. Order blanks usually are available in the late fall or early winter for the next spring planting. In filling applications for seedlings, the state nursery operates on a "first ordered — first served" basis. Since it may be impossible to fill late orders for some species, it is a good practice to order early. Delivery procedures are explained on the seedling application form.

What about cost sharing on tree planting?

If application for cost-sharing is made at the designated time before the trees are planted, you may receive financial assistance. Specifications must be followed and the planting must be approved by a technical forester. Contact your County Agricultural Stabilization and Conservation Service (ASCS) office for details.



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