

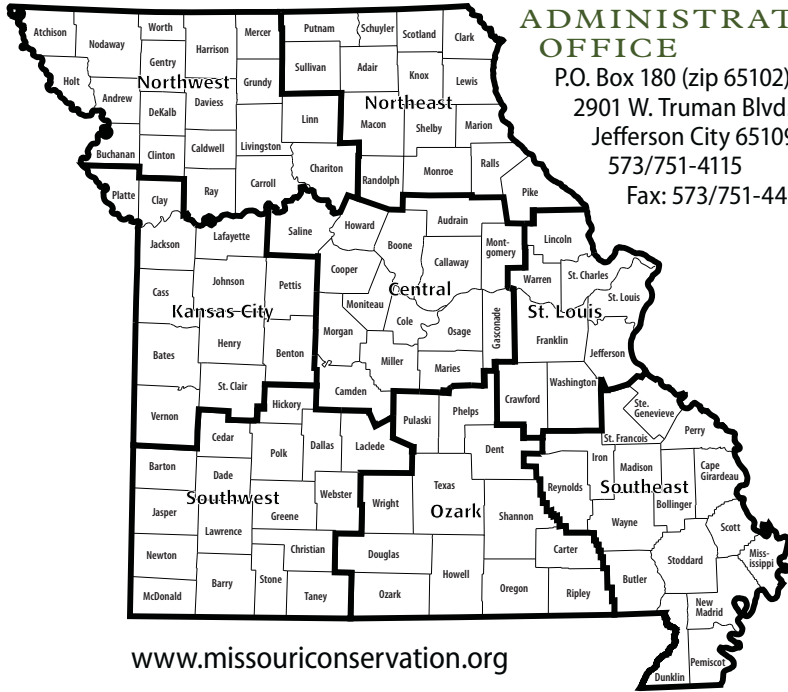


# MISSOURI URBAN TREES

Missouri Department of Conservation



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# MISSOURI URBAN TREES

Missouri Department of Conservation

## TABLE OF CONTENTS

Choose the Right Tree for the Right Space.....	2
Purchasing and Transporting Your Tree.....	3
Planting Your Tree.....	4
Care of Newly Planted Trees.....	6
USDA Hardiness Zone Map.....	7
Tree Species Suitable for Special Conditions.....	8
Recommended Trees for Missouri Landscapes.....	9
Conifers.....	10
Small and Medium Trees.....	18
Large Shade Trees.....	31
Undesirable Trees for Landscape Planting.....	48
Summary of Tree Characteristics.....	51
Species Index.....	55
Glossary.....	56
References.....	57

## DEFINITION OF GROWTH RATES OF TREES

**SLOW:**  
less than 6 inches of growth a year

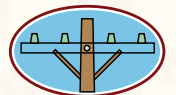
**MEDIUM:**  
7-18 inches of growth a year

**FAST:**  
more than 18 inches of growth a year

## KEY TO SYMBOLS



This symbol indicates the size and shape of a mature tree in relation to the height of an average human.



This symbol indicates a tree that is small enough to be planted under a powerline. Trees that do not have this symbol should be planted away from powerlines so at maturity they cannot fall on or touch the lines.

# CHOOSE THE RIGHT TREE FOR THE RIGHT SPACE

Finding the correct tree for any given spot will not only enhance the value and appearance of the property, but will avoid problems in the future. Many urban tree problems are the result of improper location or poor species selection for the planting site. Trees in urban areas are troubled by growing conditions that are much less than ideal due to removal of topsoil, soil compaction, soil contamination, air pollution or lack of growing space. The more limitations on the growing site, the more carefully trees will need to be selected. Follow these steps below to evaluate your planting site. Then use the species descriptions in this booklet and the table on page 51 to help ensure a proper “fit” and a healthy tree.

1. Determine where you want to plant a tree and what you want it to provide—shading a home or driveway, separating two ownerships, screening a neighbor’s backyard, providing cover for songbirds, or any number of other objectives. Be specific.
2. Calculate how much space you have. Choose a tree that at maturity will fit that space. You will need to measure how much room there is for the tree to grow both in height and width.
3. Monitor the site to see how much sunlight the tree will receive throughout the day. How much sunlight each tree needs to grow well varies with species. Some trees grow naturally as understory trees

and tolerate shade well; others require full sun. All trees will have sparser foliage and fewer flowers at reduced light levels.

4. Analyze the soil. Trees grow best in a soil that is at least 3 feet deep, allows water to percolate through it, but can retain adequate moisture for roots. A certain amount of decomposed wood or leaves, or organic matter, is desirable. An ideal acidity-alkalinity measure, called pH by soil scientists, is about 5 to 6. Trees planted in poor soils will grow slower and may have more problems than trees growing in better soil. For information on performing a soil test, contact your county University of Missouri Extension office or go online at [extention.missouri.edu](http://extention.missouri.edu).
5. Do a simple percolation test by digging a hole 12 to 18 inches deep and filling it with water. If any water is still in the hole 12 to 18 hours later, then you have compacted or heavy clay soils. Heavy, compacted soils with poor water percolation may hold too much water and cause roots to suffocate. See page 5 on how to plant trees in compacted soil. Well-drained, porous soils can provide more usable water to the roots. Very sandy or gravelly soils cannot hold sufficient water for some trees. A few trees are adapted to grow in wet and swampy sites, but most will decline in poorly drained soils.

*Large trees on the east and west sides provide shade that can lower a home’s cooling costs by 10 percent.*

*Small evergreens are useful as privacy screens. All trees serve as habitat for songbirds and wildlife.*

*For plantings near powerlines, use small trees or shrubs.*

*Plant large trees far enough away from powerlines and buildings to avoid damage during storms and power outages.*

*Large shade trees improve curb appeal, increasing property values by 5 to 20 percent.*



# PURCHASING AND TRANSPORTING YOUR TREE

After you have evaluated the tree planting site and selected an appropriate species, it is time to visit a reputable nursery or garden center that carries good quality trees. If the species you chose is not available, ask for suggestions about other trees that will meet the same requirements.

Trees may be available in a variety of root conditions. Balled and burlapped and bare rooted trees are dug from the ground with only a small part of the root system intact. Trees in containers may have many or all roots included, but check to be sure the tree is not too large for the container before purchasing. If the roots closest to the container are larger than your little finger, the tree has outgrown its container and may have a shortened lifespan.

Each growing method has advantages and disadvantages. Balled and burlapped trees may start normal growth rates sooner than similar size trees that were bare rooted. Container-grown trees are another means of getting a quick start. Trees that are growing in containers or are balled and burlapped may be planted at almost any time of the year. Early spring and fall are the best times to plant bare rooted trees. Planting during the heat of summer is possible, but extra care will be needed after planting.

Regardless of root condition, purchased trees should have these desirable characteristics:

- Long, vigorous branches on current year's growth, with well-developed buds
- Pleasing proportion of height to spread
- Well-developed lateral branches
- A straight trunk with an absence of wounds
- Firm, moist rootball or container soil

Also be sure the tree does not have a great deal of soil added over the root flare. The root flare is the point where the top major roots extend out from the tree trunk. Unfortunately many new trees have the root flare buried under several inches of soil, which can cause trunk rot.

Trees are living things and should be treated as such, especially during the trip home. Protection from drying is critical. Roots must be kept moist. Foliage, branches and trunks also can dry out. If transporting in an uncovered truck bed, be sure to keep the tree covered to protect against drying winds.

Trees should be planted as soon as you can. If they must be stored, place them away from excessive exposure to sun and wind. Cover balled and burlapped or bare rooted tree roots with moist wood chips, sand or loose soil.



Noppadol Paothong, Missouri Department of Conservation

**LIFT TREES BY THE CONTAINER OR ROOTBALL—NOT BY THE TRUNK—TO AVOID BREAKING FINE ROOTS.**

# PLANTING YOUR TREE

After you have evaluated the site and selected your tree, it is time to prepare the hole. Remember to always lift trees by the container or rootball—not by the trunk—to avoid breaking fine roots.

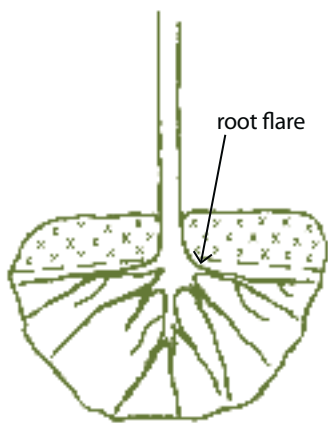
## STEP 1: DETERMINE THE PROPER PLANTING DEPTH

Trees should be planted with their top major roots even with the soil line. Trees planted at the wrong depth do not develop well and may have shortened life spans. Excess soil should be removed before planting. For balled and burlap-wrapped trees, gently poke a stiff wire through the burlap next to the tree trunk until you hit a root. Do not remove the burlap. Note the distance between the top of the root ball to the first root. Check in two or more locations around the trunk to make sure you've located the top major roots. The distance from the top-most buried root to the bottom of the ball is the correct depth to dig your hole. Carefully remove the excess soil from the top of the root ball once it is in the planting hole. Container trees should have the soil carefully removed from the top, exposing the root flare, and then planted.

## STEP 2: BEFORE PLANTING

Be sure to remove the following:

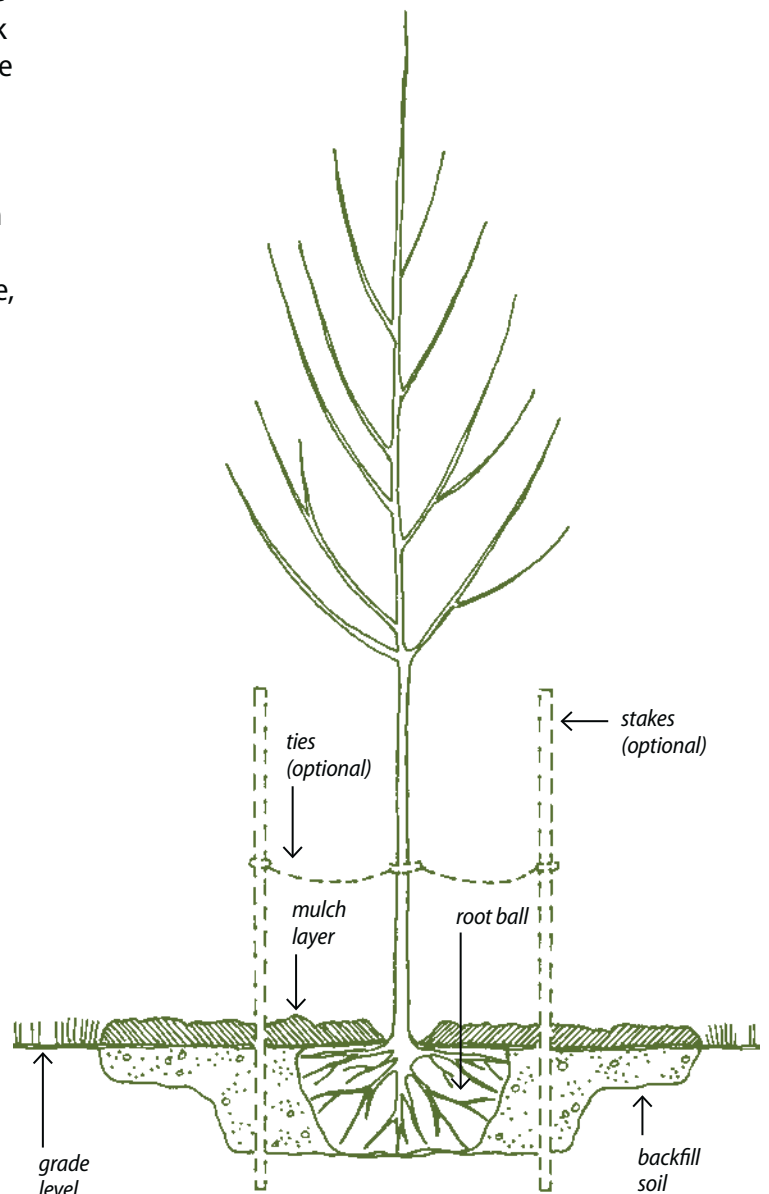
- All excess soil on top of the ball, just exposing the root flare
- Burlap from the top half of the root ball to prevent wicking of moisture from the soil
- Any container holding the root system
- The wire basket from around the root ball
- All tags, labels and strings



Remove excess soil to expose the root flare.

## STEP 3: PLANTING ACCORDING TO SOIL TYPE

If your site's percolation test showed that you have uncompacted soil (see page 2), dig a pit at least twice the diameter of the root ball and deep enough to place the root flare even with or up to 1 inch higher than the soil line. Handle the tree by the root ball, not by the trunk. Be sure the root ball or container soil rests on solid ground to prevent settling. Carefully cut the twine wrapped around the stem at the top of the root ball.



Planting in uncompacted soils

If your site's percolation test showed that you have compacted soil (see page 2), you will have to take the following additional steps.

- Dig a wide, shallow hole three to four times the width of the root ball or container and only half as deep to provide the roots the oxygen they need.
- Mound backfill soil slightly to the top of the root flare, covering the entire excavation. This creates a raised planting bed, which will improve the tree's performance.
- Soils that hold excessive moisture may need a subsurface drain tube installed below the root ball.

#### STEP 4: BACKFILL SOIL

Make sure the tree is straight before backfilling. Use the same soil that came out of the pit. Finely chop the soil and remove any stones or debris. Avoid potting soil, peat moss or other amendments. Fill the hole halfway, watering thoroughly as you go, then finish backfilling. Work the soil around the ball gently so that no air pockets are left. Firm the soil so the tree is vertical and adequately supported, but do not pack the soil.

#### STEP 5: WATER

Saturate the entire backfilled soil with water. A slow, gentle soaking is best. Add more soil if needed to compensate for settling.

#### STEP 6: MULCH

Cover smoothed soil with 3 inches of wood or bark chips. Shape the mulch into a doughnut 2 to 3 feet wide, leaving a small gap near the trunk. Do not mound mulch onto the trunk of the tree. Mounding encourages trunk decay, which can weaken and kill trees. Black plastic, grass clippings or sawdust should not be used as mulch. Keep mulch weeded. Replace as needed.

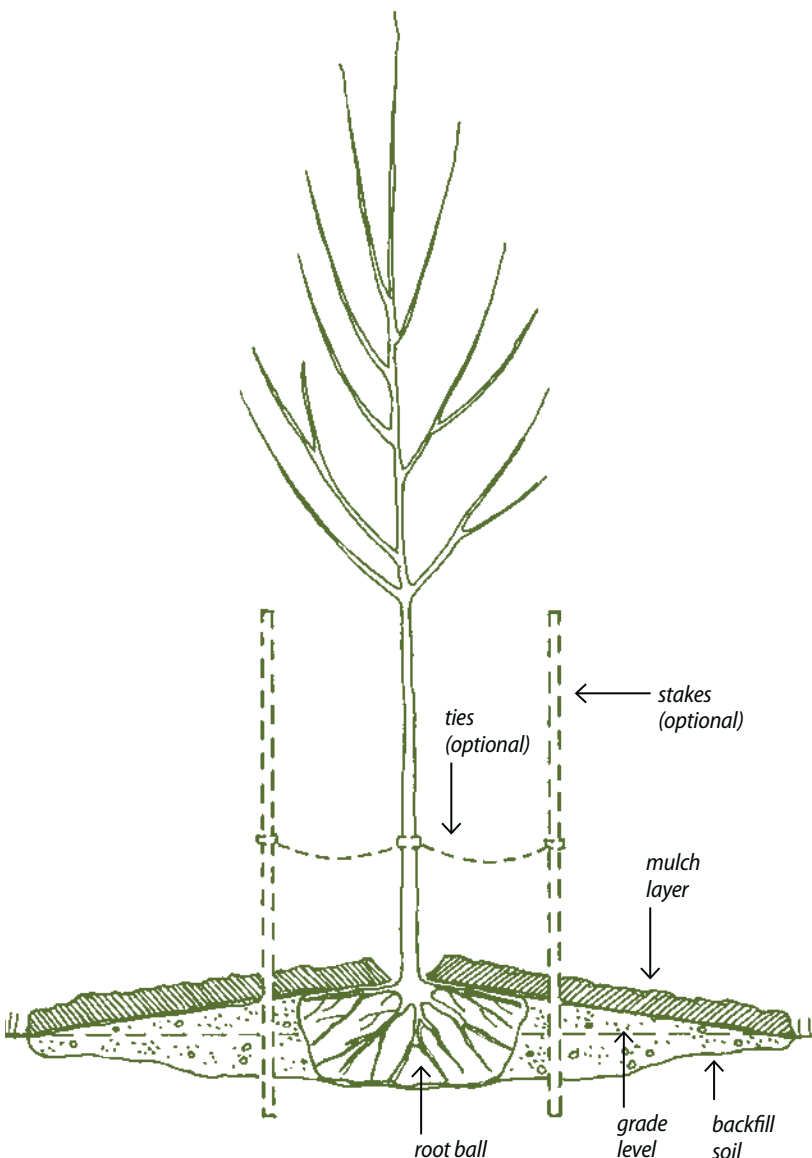
#### STEP 7: PRUNING

Remove only broken or badly deformed branches the first year. Begin a regular pruning program the third year after planting.

#### STEP 8: STAKES (OPTIONAL)

Stakes may be used to prevent shifting of the root ball or to protect the stem from mowing equipment. If needed, the tree should be guyed strongly enough to provide support, but flexibly enough to allow 6 to 8 inches of sway. Drive one or more stakes near the tree but not through the roots. The best guying materials are wide and flexible, such as plastic horticultural tape or canvas webbing. If guy wires are used, place them through tubing or hose sections to prevent damage to the bark. All guys and ties should be placed low on the trunk. Remove guys and ties as soon as the tree can stand alone—about 3 months, but no longer than a year after planting.

**Note:** Research indicates that trunk wraps provide little, if any benefit to trees. In fact, they can encourage damaging insects or disease-causing fungi. Avoid using trunk wraps unless specifically recommended.



*Planting in compacted soils*

# CARE OF NEWLY PLANTED TREES

Following the information below will help you grow well-established, healthy trees.

- Keep the soil around the roots moist but not wet with routine watering. Examine soil once a week during dry periods. Gravelly or sandy soils may need more frequent watering; silt or clay soils may require less.

- Place a 3-inch layer of mulch around the tree to protect the roots and to keep lawn mowers away from the trunk. Replace mulch every two years or so to maintain a 3-inch layer. Widen the mulch ring as the tree grows.

- Remove support wires or ties from a tree as soon as possible. If a tree has been staked, check to see if it can stand on its own about three months after planting. If not, check it again in another three months, and so on. Stakes without ties may be left in place to protect the trunk from lawn mowers.

- Remove dead or broken branches immediately, but do not prune any further for at least three years. Pruning can delay establishment because the food-producing leaves are removed. Plan for removal of low forks or V-shaped crotches in the trunk to avoid future splitting.

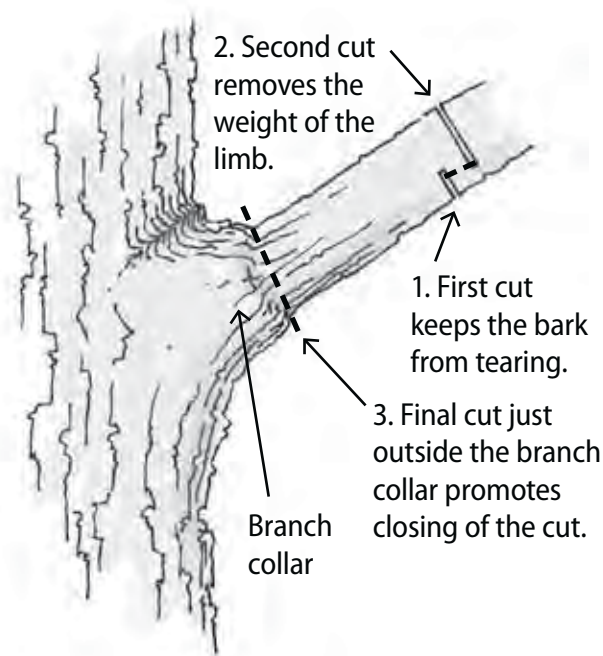
Generally, lower side branches can be removed from the trunk as the tree grows to promote a “shade-tree” form. Always leave the branch collar intact when removing a branch from the trunk.

- Check leaves and trunk for insect and pest damage. Potentially serious insects include emerald ash borers, bagworms and other spring feeding caterpillars. Some diseases to watch for are anthracnose, leaf rusts and fire blight. Consult a garden center, arborist, forester or extension specialist to learn the correct control. If certain pests are a persistent problem, it may be best to replace the tree with one that has fewer problems.

- Fertilizer is seldom required for trees and is not a remedy for poor growing conditions. However, it may be used to increase growth rates. If this is desired, broadcast granular slow-release fertilizer around the root zone of the tree. Cover a circle roughly the diameter of the branch spread. Apply 2 to 3 pounds of actual nitrogen (the first number in the three specified on a fertilizer bag, which is a percentage of the mixture) per thousand square feet evenly around the base of the trees. For example, a small tree with a 4-foot branch spread will require about 1/4 pound of 13-13-13 fertilizer. Note: Use sparingly for weak or distressed trees.

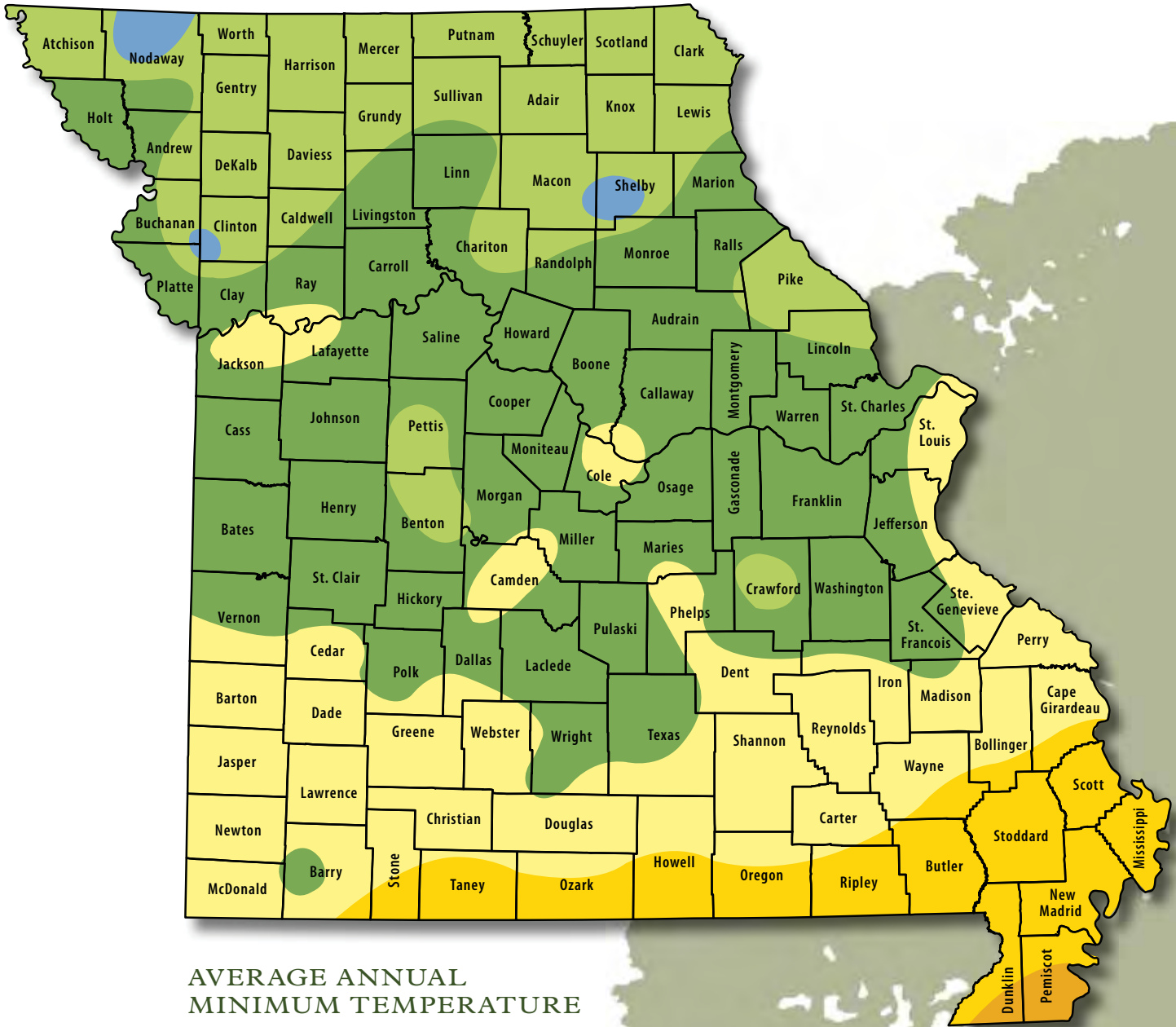
TREE MAINTENANCE TIMETABLE			
Years After Planting	Necessary	Desirable	Optional
0-3	Watering Mulching	Pest Monitoring	Stakes
3-5	Mulching Watering Pruning	Pest Monitoring	Fertilizing
5-10	Pruning	Mulching Pest Monitoring	Fertilizing
10+		Pruning Mulching	Fertilizing Pest Monitoring

## THREE-CUT METHOD FOR PRUNING LIMBS





# USDA HARDINESS ZONE MAP



## AVERAGE ANNUAL MINIMUM TEMPERATURE

<span style="color: blue;">■</span>	<b>ZONE 4B</b>	-25 TO -20
<span style="color: lightgreen;">■</span>	<b>ZONE 5A</b>	-20 TO -15
<span style="color: green;">■</span>	<b>ZONE 5B</b>	-15 TO -10
<span style="color: yellow;">■</span>	<b>ZONE 6A</b>	-10 TO -5
<span style="color: orange;">■</span>	<b>ZONE 6B</b>	-5 TO 0
<span style="color: darkorange;">■</span>	<b>ZONE 7A</b>	0 TO 5

# TREE SPECIES SUITABLE FOR SPECIAL CONDITIONS

## TOLERANT OF MOIST AND WET SITES

Alder, European	Maple, red	Planetree, London
Baldcypress	Oak, swamp chestnut	Spruce, white
Birch, river	Oak, swamp white	
Buckeye, Ohio	Oak, water	
Magnolia, sweetbay	Oak, willow	

## TOLERANT OF DRY CONDITIONS

Crabapple, flowering	Oak, scarlet	Pine, limber
Hawthorn	Oak, Southern red	Redcedar, Eastern
Honeylocust, thornless	Oak, swamp white	Rubbertree, hardy
Oak, chinkapin	Oak, willow	Sycamore, American
Oak, post	Pine, Japanese black	

## TOLERANT OF LIGHT SHADE

Alder, European	Fir, white	Redbud, Eastern
Basswood, American	Hemlock, Canadian	Serviceberry, downy
Beech, American	Holly, American	Silverbell
Beech, European	Hophornbeam	Sourwood
Blackgum	Hornbeam, European	Spruce, Norway
Buckeye, Ohio	Magnolia, saucer	Spruce, White
Buckeye, red	Magnolia, sweetbay	Yellowwood
Dogwood, flowering	Maple, sugar	

## MOST TOLERANT OF URBAN CONDITIONS

Baldcypress	Hophornbeam	Pagodatree, Japanese
Birch, river	Juniper, Chinese	Pine, Japanese black
Blackgum	Katsura	Pine, limber
Coffeetree, Kentucky	Linden, littleleaf	Redbud, Eastern
Corktree, Amur	Oak, Northern red	Redcedar, Eastern
Elm, American	Oak, sawtooth	Rubbertree, hardy
Elm, Chinese	Oak, Shumard	Zelkova, Japanese
Ginkgo	Oak, swamp white	
Honeylocust, thornless	Oak, willow	

## SUITABLE FOR STREET PLANTING

Baldcypress	Honeylocust, thornless	Oak, sawtooth
Beech, American	Hophornbeam	Oak, scarlet
Beech, European	Hornbeam, European	Oak, Shumard
Birch, river	Katsura	Oak, swamp white
Blackgum	Linden, littleleaf	Oak, willow
Corktree, Amur	Maple, red	Pagodatree, Japanese
Elm, American	Oak, bur	Redcedar, Eastern
Elm, Chinese	Oak, English	Zelkova, Japanese
Ginkgo	Oak, Northern red	





Jim Rathert, Missouri Department of Conservation

# RECOMMENDED TREES FOR MISSOURI LANDSCAPES

The trees in this section are considered to be desirable species. They should grow well in Missouri when planted properly under the right conditions. The tables with each description and in the appendix detail the growth requirements for each species. Most of these trees can be found in your local commercial nursery. However, some of these trees are not normally grown in quantity by nurseries, which may make them difficult to locate in a local garden center.

TYPE	PAGE
<b>Conifers .....</b>	<b>10</b>
<b>Small and medium trees .....</b>	<b>18</b>
<b>Large shade trees .....</b>	<b>31</b>



# CONIFERS

## BALDCYPRESS *Taxodium distichum*

Hardiness zones: 5b-10  
Height: 50-70 feet  
Spread: 20-30 feet  
Fall color: coppery-bronze  
Soil moisture: wide range  
Light: full sun  
Growth rate: medium



Jim Rathert, Missouri Department of Conservation



Jim Rathert, Missouri Department of Conservation

Baldcypress becomes a large tree with fine, fern-like foliage. Although it resembles an evergreen tree in summer, the foliage drops in fall, revealing the stately branch structure. The overall shape of the tree is broadly to narrowly pyramidal.

This is the same cypress native to swamps in southeast Missouri, where it forms special root structures called "knees." It is adaptable to a wide range of soils and conditions and need not be grown only on wet sites. If a tree produces a few knee-like

growths in the lawn, they may be cut off. Male catkins form in late summer and their drooping appearance adds winter interest. The small, round cones produced by more mature trees may clutter lawns. Fibrous bark is attractive in all seasons.

Baldcypress is easily transplanted and grows best in acid soils. It has no serious pest problems, although spider mites or bagworms may occasionally attack some trees. Fall color is a coppery-bronze.

## DOUGLAS FIR *Pseudotsuga menziesii*

Hardiness zones: 4-7a  
Height: 40-60 feet  
Spread: 10-20 feet  
Fall color: green  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: slow to medium



Chris Starbuck



Richard Webb, Self-employed horticulturist, Bugwood.org

This conifer, which is an important timber tree in the Pacific Northwest, is used successfully as an ornamental in Missouri. Adequate soil moisture and humidity are important since dry conditions can damage or kill it. Growth is dense and pyramidal when young,

becoming looser and more open with age.

Missouri's hot summers suppress rapid growth and may cause browning. It is most successful when planted where larger trees or building provide shade during hot summer afternoons.



*Abies concolor* WHITE FIR OR CONCOLOR FIR

Cliff White, Missouri Department of Conservation



Cliff White, Missouri Department of Conservation



Hardiness zones: 3-8a  
 Height: 40-50 feet  
 Spread: 15-30 feet  
 Fall color: green  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: slow



Firs grow best in climates with cool summers. The white fir is the best choice where summers are hot and droughts occur. It develops a formal conical shape for landscape use. Its appearance is similar to spruce, but the needles look softer.

This slow-growing tree is adaptable to many conditions and somewhat pollution tolerant. White fir does not tolerate poor drainage, particularly in heavy soils. While it

prefers full sun, it develops well in light shade, which may actually be beneficial to young plants in warmer sections of the state.

A number of cultivars have been developed, but most are not readily available. The selection best adapted to warmer areas has blue-green needles rather than the normal gray-green. White fir is a durable evergreen that deserves more landscape use than it has enjoyed in the past.

*Tsuga canadensis* CANADIAN HEMLOCK

Cliff White, Missouri Department of Conservation



Cliff White, Missouri Department of Conservation



Hardiness zones: 3-8a  
 Height: 40-60 feet  
 Spread: 20-30 feet  
 Fall color: green  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: slow



Hemlocks provide a fine-textured foliage that blends well into many garden settings. While hemlocks can be grown in full sun, they are shade tolerant. It is one of the few larger evergreens suitable for planting in moderate shade.

Although relatively slow growing, it may be used as a tall evergreen screen where one is needed for varying light conditions. While well-suited to many urban conditions, hemlock is not highly pollution tolerant.

Hemlock has a pyramidal growth habit. Ends of branches droop slightly, giving it a relaxed feeling. The small cones hang on through the winter adding additional landscape interest. It is not tolerant of poorly drained, heavy soils.

Extended drought can be damaging, so hemlock should not be planted in low maintenance areas where irrigation is impossible.



# CONIFERS

## AMERICAN HOLLY *Ilex opaca*

Hardiness zones: 5b-9  
Height: 30-50 feet  
Spread: 15-30 feet  
Fall color: green  
Soil moisture: moist  
Light: light shade  
Growth rate: slow



Although American holly is Missouri's most durable broad-leaved evergreen tree, it is only found as a native species in the southeastern portion of the state. If planted in more northern locations, the tree will need protection from winter winds.

American holly grows best in acid, organic soils that are well-drained but have adequate moisture. Both male and female plants are needed for maximum berry production. Generally, one male tree provides pollination for four to six female trees. Birds are very fond of the bright red holly berries, so berries are seldom found past

midwinter. If they do, they remain bright red for most of the winter.

American holly cultivars vary considerably. In all of them, leaves are more pale and dull than English holly, which is the species best known for holiday decoration. 'Foster' holly is a popular hybrid, which is more upright and finer textured than American holly.

Young American holly trees develop a conical shape similar to many needled evergreens. Although growth is slow in our climate, American holly needs space to develop into a tree without pruning.



Chris Starbuck

Matt Seek, Missouri Department of Conservation

## CHINESE JUNIPER *Juniperus chinensis*

Hardiness zones: 3b-9  
Height: 20-60 feet  
Spread: 15-25 feet  
Fall color: green  
Soil moisture: average  
Light: full sun  
Growth rate: slow to medium



The Dow Gardens Archive, Dow Gardens, Baywood.org

Chinese juniper may be found in many shapes and sizes because of the profusion of cultivars available. The well-known 'Pfitzer' juniper is a Chinese juniper that is low and wide-spreading. The tree-forming varieties are upright and conical.

With age they may reach 20 to 60 feet and become a single-trunked tree suited to many landscape conditions and soils. Upright forms are most often used for urban sites where tall evergreen

screens are wanted. They become most dense in full sun locations.

Cultivars with green foliage, as well as different intensities of bluish foliage, are available. Cultivars that develop into small trees include 'Hollywood,' 'Keteleeri,' 'Hetzi Column,' 'Robusta Green' and 'Wintergreen.'

Chinese junipers have few major pests, but tip blight and bagworms may sometimes attack them.



Courtesy Missouri Botanical Garden PlantFinder



*Pinus strobus* EASTERN WHITE PINE



Paul Wray, Iowa State University, Bugwood.org



Hardiness zones: 3-8  
 Height: 60-80 feet  
 Spread: 30-40 feet  
 Fall color: green  
 Soil moisture: average  
 Light: full sun  
 Growth rate: fast



Eastern white pine becomes a large evergreen tree. Its long, soft needles give the tree a graceful look that fits into many settings. It has become more popular than Scotch pine because it is less susceptible to pine wilt nematode and environmental stress.

White pine is a fast-growing evergreen that can provide a quick

accent or screen. Although some white pines are sensitive to air pollutants and salt-water runoff, it remains one of the best pines for our climate.

Trees grow quite large, and should be used where there is plenty of space so pruning is not needed.

Dr. Barbara Rothenberger

*Pinus thunbergii* JAPANESE BLACK PINE



Courtesy Missouri Botanical Garden PlantFinder



Hardiness zones: 5b-8  
 Height: 30-60 feet  
 Spread: 20-40 feet  
 Fall color: green  
 Soil moisture: wide range  
 Light: full sun  
 Growth rate: medium



Japanese black pine is a popular landscaping tree because of its loose, informal growth habit. It has been popular for use in Japanese garden designs. It is well adapted to many soils, and has pollution and salt tolerance that make it suitable for many urban sites.

Japanese black pine also is tolerant of heat and drought. In spite of these good qualities, damage may result in our climate when rapid

temperature changes occur in fall or winter. As a result, needle and twig damage are possible.

Japanese black pine grows well in low-fertility soils, but must have full sun. It produces silvery-white elongated candles on the ends of its branches during the fall that give it a distinctive appearance in winter.

This pine is without major pest problems, but does not have the cold tolerance of red or white pines.

Richard Webb, Self-employed horticulturist, Bugwood.org



# CONIFERS

## JAPANESE RED PINE *Pinus densiflora*

Hardiness zones: 5b-7b  
Height: 40-60 feet  
Spread: 40-60 feet  
Fall color: green  
Soil moisture: average  
Light: full sun  
Growth rate: slow



Dr. Barbara Rothenberger

Japanese red pine is used for landscaping because of its interesting form and decorative bark. The foliage is bright bluish green to olive green. Bark on the trunk and large branches is orange-red, adding interest in all seasons. Trunks are frequently crooked or leaning, branches spread horizontally and the crown is broad and flat.

This tree is free of any insect and disease problems and requires little

maintenance. Growth is relatively slow for a pine.

'Oculus Draconis' is a cultivar with variegated needles with two yellow bands. 'Ubraculifera' is a dwarf form with many branches in a vase-shaped arrangement, and 'Pendula' is a cultivar with a weeping form.



Courtesy Missouri Botanical Garden PlantFinder

## LIMBER PINE *Pinus flexilis*

Hardiness zones: 4b-7  
Height: 30-50 feet  
Spread: 20-30 feet  
Fall color: green  
Soil moisture: average  
Light: full sun  
Growth rate: medium



Jim Raibert, Missouri Department of Conservation

Not readily available in the past, this pine is becoming more widely used. It is a very durable pine suitable for urban landscape use. As the name implies, the flexible branches reduce chances for breakage by high winds or heavy snows.

Limber pine adapts to many soil types, even shallow soils, although it grows best in deep, well-drained soils. It should be grown in full sun, but will tolerate some shade.

The general appearance is similar to white pine, but needles point forward

and growth is a little more open. The most popular cultivar is 'Vanderwolf's Pyramid' that has a denser form.

Limber pine does not grow as fast as white pine, but may still produce 2 feet of growth per year once it is well-established on a good site.

Limber pine is subject to the common pests of pines, but none present serious problems.



Cliff White, Missouri Department of Conservation



*Pinus resinosa* RED PINE



Hardiness zones: 2b-6  
 Height: 40-60 feet  
 Spread: 25-40 feet  
 Fall color: green  
 Soil moisture: wide range  
 Light: full sun  
 Growth rate: medium

Red pine is extremely cold tolerant, but is less heat tolerant. The needles are long and stiffer than white pine. Branching is fairly open, but it has the overall symmetry of many pines. Dark green needles are retained for about four years before the older, inner needles drop.

Although a native of the northern United States, it is still tolerant of Missouri growing conditions. It is slower growing in our climate and becomes a tree of only medium size.

This pine develops bark that is orange to reddish on the upper trunk of older trees.

The needle appearance of red pine is similar to Austrian pine, although it is less coarse.

It currently appears to be less susceptible to the tip blight that causes severe damage to Austrian pine in many locations

Chris Starbuck

Bill Cook, Michigan State University, Bugwood.org

*Juniperus virginiana* EASTERN REDCEDAR



Hardiness zones: 2-9  
 Height: 30-50 feet  
 Spread: 10-25 feet  
 Fall color: green  
 Soil moisture: average  
 Light: full sun  
 Growth rate: medium

Eastern redcedar, the common evergreen found in fencerows and fields and along roadsides, grows well in a wide range of conditions. It is a tree for full sun although young plants may be found growing in shade. With age, trees in shade will be less dense and are more subject to disease problems.

Many cultivars of redcedar have been selected and propagated for landscape use. One of the most common is 'Canaertii,' which produces a loose, upright growth with deep green

color through the year. This is a female selection with bluish seeds for fall and winter color.

Redcedar is fairly pest free, but twig blight and bagworms may attack them. It is a host for several rust diseases that alternate between infecting cedar and members of the rose family.

Redcedars make durable screens, tall hedges or accent. This is the same cedar that produces the wood used for cedar chests and novelties.

Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation



# CONIFERS

## COLORADO SPRUCE, BLUE SPRUCE *Picea pungens*

Hardiness zones: 2b-7  
Height: 30-60 feet  
Spread: 15-25 feet  
Fall color: green  
Soil moisture: average  
Light: full sun  
Growth rate: slow



Jim Rathert, Missouri Department of Conservation

Since the most popular Colorado spruce cultivars are those with bluish needles, this tree is best known as blue spruce. It can tolerate Missouri weather, soil and drought conditions better than many other spruce species.

The tree develops a formal, conical shape with very stiff branches and needles. Growth is slow, but it gradually forms a 30- to 60-foot tree averaging only about 1 foot of growth per year. Deep soils with good drainage provide

the best growth. It is most useful as a formal landscaping plant.

It needs full sun and a location with good air circulation, to help avoid *Cytospora* canker, which kills low branches and inner needles. Several insect pests may attack spruces.

Cultivars with the most intense blue color demand the highest prices. Cones are often abundantly produced on older trees.



Jim Rathert, Missouri Department of Conservation

## NORWAY SPRUCE *Picea abies*

Hardiness zones: 2-7  
Height: 50-70 feet  
Spread: 30-45 feet  
Fall color: green  
Soil moisture: moist to average  
Light: full sun to light shade  
Growth rate: medium



Matt Seak, Missouri Department of Conservation

As a young tree, Norway spruce has a pyramidal shape that becomes very broad as it matures. The branches are pendulous, giving the tree a graceful appearance. Needles are light green when young, but develop a rich, deep green color.

It may be invaded by spider mites and other spruce pests, but generally these are not a major problem. It grows very large and should only be used in landscapes where plenty of space is available.

Older Norway spruces do not always maintain attractive lower branches, but they may be removed to develop a trunk that accentuates the graceful drooping character of its higher branches.

Like all spruces, Norway spruce grows best in deep soils that are well-drained and have constant soil moisture. This tree develops best in full sun but is tolerant of light shade.



Jim Rathert, Missouri Department of Conservation



*Picea glauca* WHITE SPRUCE



Hardiness zones: 2-6  
 Height: 30-50 feet  
 Spread: 10-20 feet  
 Fall color: green  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: slow

The short, gray-green needles of white spruce produce a fine texture. Although not extremely heat and drought tolerant, it is still a useful plant for urban landscapes.

Its growth is very slow, only 2- to 3-inches a year. Its dense, stiff, conical shape gives a sheared look, without shearing, that makes it frequently used for a formal vertical accent.

White spruce is subject to spider mite damage during hot, dry weather. Severe droughts or poor drainage

during wet seasons can be damaging, especially to older trees.

Its most popular form is the cultivar 'Conica' known as the dwarf Alberta spruce. This form is usually grown as a shrub.

Another white spruce cultivar, 'Densata', is known as the Black Hills spruce. It does not grow as slowly as dwarf Alberta spruce, and gradually reaches tree size. It has a rich, deep green color.

Matt Seek, Missouri Department of Conservation

Matt Seek, Missouri Department of Conservation

## SMALL AND MEDIUM TREES

### EUROPEAN BEECH *Fagus sylvatica*

Hardiness zones: 4-6  
Height: 40-50 feet  
Spread: 15-25 feet  
Fall color: yellow-bronze  
Soil moisture: average  
Light: full sun to light shade  
Growth rate: slow



Jim Rathert, Missouri Department of Conservation



Chris Starbuck

The European beech becomes a large shade tree in moist, moderate climates. Hot summers and rapid temperature fluctuations in winter will limit its growth in most of Missouri. Planting should be limited to protected sites, light shade or landscapes where irrigation is available during hot, dry periods. The glossy foliage with wavy margins, smooth gray bark and densely pyramidal to oval crown make it a useful accent tree.

Because beech is popular worldwide, many cultivars exist including 'Asplenifolia,' which has cut leaves; 'Atropunicea' or 'Purpurea,' the purple-leaf beech; and 'Purpurea Tricolor' or 'Roseomarginata' known as tricolor beech.

Sun scald of the bark, along with leaf scorch, are common problems during hot or dry weather. European beech should not be ignored, but limited in its use.

### OHIO BUCKEYE *Aesculus glabra*

Hardiness zones: 3b-7  
Height: 20-40 feet  
Spread: 15-30 feet  
Fall color: yellow  
Soil moisture: moist to average  
Light: full sun to light shade  
Growth rate: slow



Jim Rathert, Missouri Department of Conservation



Chris Starbuck

The lower branches of buckeyes often bend down, giving them a rounded form. The compound leaves create a somewhat coarse texture.

White, trumpet-shaped flowers in upright spikes are found in the foliage in spring. Buckeyes do best in full sun, but will grow and flower in light shade.

They develop leaf scorch easily on dry sites or in drought, so locations with adequate summer soil moisture are best. As with other buckeyes and horsechestnuts, leaf blotch disease often ruins Ohio buckeye's late summer foliage.



## SMALL AND MEDIUM TREES



### *Aesculus pavia* RED BUCKEYE



Hardiness zones: 6-9  
 Height: 10-20 feet  
 Spread: 10-20 feet  
 Fall color: yellow-green  
 Soil moisture: moist to average  
 Light: full sun to light shade  
 Growth rate: slow



The red buckeye is a small tree with single or multiple trunks. The light red flowers in upright panicles are produced in early spring and are a source of unusual spring color. Summer leaves have a bright green color, but drop early

in fall without significant color.

Leaf blotch is a common disease that attacks buckeyes in late summer and may add to early defoliation. This tree is easily grown, but fairly slow growing.

Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation



### *Prunus species* FLOWERING CHERRY



Hardiness zones: 5-8  
 Height: 20-30 feet  
 Spread: 15-25 feet  
 Fall color: yellow-bronze  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: medium



#### Japanese flowering cherry

*Prunus serrulata*

There are many varieties of Japanese flowering cherries that have been developed, resulting in numerous plant shapes and flower forms. The most common cultivar is probably 'Kwanzan,' which produces double deep pink flowers. It develops an upright, vase-shaped branching habit, and is one of the most hardy cultivars.

Japanese flowering cherries are subject to twig or bark damage during severe winters or rapid temperature changes.

#### Higan cherry

*Prunus subhirtella*

The most popular Higan cherry is the weeping variety pendula, often

simply called a weeping cherry. Higan cherries have single pink flowers that are not long lasting. For this reason, cultivars with double flowers, such as 'Pendula Plena Rosea' should be preferred when available.

The weeping trees are graceful and broad-spreading, which makes them effective for an accent in bloom and also throughout the season. A Higan variety called *Autumnalis* also is sometimes available. It flowers in spring, but may again produce some flowers in fall.

Unlike the weeping variety and its cultivars, the fall-flowering cherry develops a spreading vase shape with a flat top. Cherries are sometimes produced, which are small and attract birds.

*A weeping variety of flowering cherry*

Many species of ornamental cherries exist, but the two most popular flowering varieties are the Japanese flowering cherry and Higan cherry. These trees flower prolifically before foliage appears, with a floral display that is spectacular. Cherries of all types need perfect drainage. If they are wanted where only tight soils or poor drainage exists, their durability may be extended by planting them in raised beds or on mounds. A number of pests and diseases may attack cherries, so they are often considered relatively short-lived trees. In our climate, many species begin to decline after about 20 years.

Jim Rathert, Missouri Department of Conservation

Chris Starbuck



## SMALL AND MEDIUM TREES

### AMUR CORKTREE *Phellodendron amurense*

Hardiness zones: 4-7  
Height: 25-45 feet  
Spread: 25-40 feet  
Fall color: yellow  
Soil moisture: moist to average  
Light: full sun  
Growth rate: medium



Jim Rathert, Missouri Department of Conservation



Jim Rathert, Missouri Department of Conservation

The Amur corktree has a very broad, rounded crown and dark green foliage. Ridged, corky bark that develops with age becomes a unique characteristic.

It is basically free of pests and adapts to many soil conditions as well

as pollution and drought. Trees may be either male or female and can be identified easily in fall when female trees have clusters of black berries. Old trees with massive branches and attractive bark develop a sculptured look.

### FLOWERING CRABAPPLE *Malus species and cultivars*

Hardiness zones: 5-8  
Height: 10-20 feet  
Spread: 8-20 feet  
Fall color: yellow  
Soil moisture: average  
Light: full sun  
Growth rate: medium



Jim Rathert, Missouri Department of Conservation



Jim Rathert, Missouri Department of Conservation

Crabapples in bloom are spectacular small, flowering trees. They are well-adapted to our soils and environmental conditions. Shapes may be columnar, weeping, oval or rounded.

Sizes of cultivars range from about 10 to 40 feet in height, but most will be 15 to 20 feet tall. Flowers may be single, semi-double or double in pink, white or red. The yellow or red fruits attract birds and wildlife.

Because several diseases attack flowering crabapples, select species and cultivars that are resistant. The most damaging are apple scab, which causes spots on the leaves and summer defoliation, and fire blight, which causes dieback of twigs

and branches. Other diseases include rust, which causes orange spots on the leaves, and mildew, which causes powdery white growth on foliage. A few of the more disease-resistant cultivars include: 'Adams,' 'Prairifire,' 'Snowdrift,' 'Callaway,' 'Donald Wyman,' 'Indian Summer,' 'Robinson,' 'Sugar Tyme' and 'Professor Sprenger.' The dwarf crabapple, *Malus sargentii*, is resistant to apple scab.

Insect pests are not a major problem. Aphids or scale may attack but can be controlled if treated promptly. Those desiring ornamental flowers plus large fruits for making jelly might select 'Dolgo,' although its disease resistance is fair.



## SMALL AND MEDIUM TREES



### *Cornus florida*    FLOWERING DOGWOOD



Hardiness zones: 5b-8  
Height: 15-25 feet  
Spread: 10-30 feet  
Fall color: red  
Soil moisture: moist to average  
Light: light shade  
Growth rate: slow



Flowering dogwood is the official state tree of Missouri. From mid-to-late April it provides a show of white or pink flowers. This is a relatively small, spreading tree, and is well-adapted to growing under larger trees where it gets light shade.

Although it is an adaptable tree, it is not highly tolerant of pollution or drought. Flower buds form in late summer and fall. If drought or other stress conditions exist during that time, trees will not flower the following spring. Severe stress causes

leaf scorch and decline of the tree. Pest problems include leaf spot disease and stem boring insects.

Flowering dogwood has attractive horizontal branching, bright red fruits, and good fall color plus its spring flowers. For deeper pink color, the cultivar 'Cherokee Chief' is commonly used. A cultivar with very large flower size is 'Cherokee Princess.' One cultivar that flowers early and more prolifically than most is 'Cloud 9.'

Jim Rathert, Missouri Department of Conservation

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### *Ulmus parvifolia*    CHINESE ELM, LACEBARK ELM



Hardiness zones: 5b-9a  
Height: 40-50 feet  
Spread: 40-50 feet  
Fall color: yellow  
Soil moisture: moist  
Light: full sun  
Growth rate: medium



Chinese or lacebark elm is often confused with the undesirable Siberian elm. Chinese elm forms a graceful round crown with mottled gray, green, orange and brown bark. It tolerates a wide range of soil conditions and is suited for urban situations.

Chinese elm is resistant but not immune to Dutch elm disease and is not as seriously affected by elm leaf beetles and similar problems as the other elms.

Matt Seek, Missouri Department of Conservation

Matt Seek, Missouri Department of Conservation



# SMALL AND MEDIUM TREES

## TURKISH FILBERT *Corylus colurna*



Hardiness zones: 4-7  
 Height: 40-50 feet  
 Spread: 20-25 feet  
 Fall color: yellow to purple to red  
 Soil moisture: wide range  
 Light: full sun  
 Growth rate: medium



Turkish filbert is an excellent urban tree that is little known and under appreciated. It is extremely tolerant of urban stresses adapting well to heat, drought, pollution, poor soils, compacted soils, dry soils, and soils of various pH. It thrives in hot summers and cold winters. While Turkish filbert will tolerate adverse conditions, it prefers well-drained loamy soils.

Newly transplanted trees will need supplemental watering the first few summers, but once established are quite drought tolerant. This species has no serious insect or disease problems. A nut 1/2 to 5/8 inches in diameter is produced in September to October. The upright pyramidal growth habit of the tree gives it a very formal appearance.



Guy Stenberg

Guy Stenberg

## HAWTHORN *Crataegus species*

Hardiness zones: 4-8  
 Height: 20-30 feet  
 Spread: 15-30 feet  
 Fall color: scarlet  
 Soil moisture: average  
 Light: full sun to light shade  
 Growth rate: medium



**Washington hawthorn**  
*Crataegus phaenopyrum*

**Green hawthorn**  
*Crataegus viridis*

Many species of hawthorn are native to Missouri, and because of the abundance of hawthorns in the natural landscape, it has been named the official state flower. The species deserving this recognition is downy hawthorn, *Crataegus mollis*.

Insect and disease pests can ruin the ornamental value of many hawthorns, although the trees usually survive. For landscape plantings, the Washington hawthorn and a

cultivar of green hawthorn called 'Winter King' have become the most frequently used. Washington hawthorn is somewhat disease resistant. The leaves and fruits of 'Winter King' can be damaged by cedar-quince rust fungus. Lacebug is an insect that may feed on hawthorn leaves, causing serious leaf browning by mid-to-late-summer.

The Washington hawthorn grows upright when young, but develops a broad canopy and a rounded form with age. The tree is thorny and sometimes used as a barrier hedge by allowing or encouraging low branching. When used for landscaping, hawthorn trees may be



Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation

shaped with single or multiple trunks. Attractive small red-orange fruits are produced in late fall and persist into the winter until severe cold turns them black or birds eat them.

*Washington hawthorn*

'Winter King' hawthorn develops into a broad, flat-headed tree. It derives its cultivar name because the red-orange fruits persist with good color long into winter, often until March or when waxwings or other birds eat them.

Hawthorns are tolerant of urban conditions. They can grow well in many soils and tolerate drought, wind and heat. They do not endure heavy shade or poor drainage.



## SMALL AND MEDIUM TREES

### *Ostrya virginiana* HOPHORNBEAM



Hardiness zones: 3b-9  
 Height: 30-40 feet  
 Spread: 20-30 feet  
 Fall color: yellow  
 Soil moisture: average  
 Light: full sun to light shade  
 Growth rate: slow



The hophornbeam, also known as ironwood, is well-suited to urban conditions. The name "ironwood" refers to the strength of the wood. This tree grows as a small- to medium-sized tree tolerant of dry, rocky soils. The fruit is papery, white and resembles hops, which is the reason for its name. These are showy against the dark green leaves

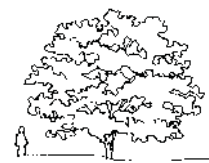
in summer. It is free of any major pests and tolerates some shade.

The growth habit of this slow-growing tree is upright pyramidal and stately in youth. As the tree matures, its shape becomes gracefully rounded. Hophornbeam is suited to almost any area.

### *Syringa reticulata* JAPANESE TREE LILAC



Hardiness zones: 3-7  
 Height: 20-30 feet  
 Spread: 15-25 feet  
 Fall color: yellow  
 Soil moisture: wide range  
 Light: full sun  
 Growth rate: medium



Japanese tree lilac is native to northern Japan, but is hardy in Missouri. It is possibly the most trouble-free lilac. It is an excellent specimen tree and also works well in group plantings. The tree has stiff, spreading branches that develop into an oval or rounded crown. Over time the tree develops a graceful arching canopy. A location with full sun is desirable.

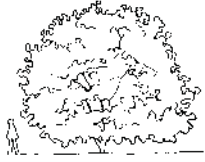
The tree bears large, extremely fragrant, creamy-white flower clusters in June. Japanese tree lilac can be considered the toughest of the lilacs being fairly resistant to powdery mildew and lilac borer.

Several cultivars are available. 'Chantilly Lace' has variegated foliage, and the leaves feature a pale creamy yellow perimeter. Direct afternoon sun is preferred and watering during drought. 'Ivory Silk' forms a pleasant, rounded tree to 25 feet tall with stocky branch structure. It blooms heavily, even as a young plant. Pests do not bother the healthy, deep green leaves and the cherry-type bark is attractive all year. 'Summer Snow' is a more compact, rounded tree, which reaches 20 feet tall and produces lots of flowers. Its toughness and small size make the plant a good street tree.

# SMALL AND MEDIUM TREES

## MAGNOLIA *Magnolia species*

Hardiness zones: 4b-8  
Height: 20-30 feet  
Spread: 15-30 feet  
Fall color: yellow-brown  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: slow



These two magnolias are part of a large group of useful landscape trees and shrubs. Magnolias grow best in deep, acid soils with adequate soil moisture. They have few pests or problems.

The **saucer magnolia** (*Magnolia x soulangiana*) can be grown statewide. It is slow growing and eventually forms a small multi-stemmed tree. It flowers very early in spring with lavender or pink tulip-shaped flowers. The slow growth allows its use as a large shrub for many years.



Matt Seek, Missouri Department of Conservation

Hardiness zones: 5b-9  
Height: 10-30 feet  
Spread: 8-15 feet  
Fall color: green  
Soil moisture: wide range  
Light: full sun to light shade  
Growth rate: medium to fast



**Sweetbay or swamp magnolia** (*Magnolia virginiana*) is evergreen in southern areas and deciduous in more northern areas. It also is grown as a multi-stemmed shrub. Sweetbay magnolia produces fragrant white flowers among the leaves in late spring and early summer.



Cliff White, Missouri Department of Conservation



*Acer* species LOW-GROWING MAPLE



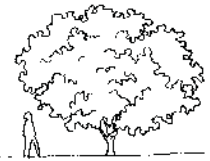
A wide array of low-growing maple trees are available for planting. The following make wonderful landscaping trees.

**Amur maple** has handsome glossy, dark-green leaves in the summer. It is easily transplanted and quite adapted to a wide range of soils and pH ranges, but prefers well-drained soil. Many cultivars exist of this plant, all of which will need a bit of pruning to maintain a single stem tree-like appearance. This tree may become invasive.

**Tatarian maple** is tolerant of adverse growth conditions and has no serious insect or disease problems. The tree tends to sucker from the base making pruning a necessity. A handsome tree specimen with a rounded to wide spreading shape can be obtained with a bit of work.

**Shantung maple** is a small round-headed tree that has a neat outline with a regular branching pattern. It is often densely branched and foliated. The bark is often tinged with purple when young. Older branches assume a gray-brown color. It has no serious insect or disease problems.

Hardiness zones: 3-8  
 Height: 15-20 feet  
 Spread: 15-25 feet  
 Fall color: yellow and red  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: fast



Hardiness zones: 3-8  
 Height: 15-20 feet  
 Spread: 15-20 feet  
 Fall color: red and reddish brown  
 Soil moisture: wide range  
 Light: full sun to light shade  
 Growth rate: slow to medium



Hardiness zones: 3-8  
 Height: 20-30 feet  
 Spread: 20-25 feet  
 Fall color: yellow to red  
 Soil moisture: wide range  
 Light: full sun to light shade  
 Growth rate: slow



Cliff White, Missouri Department of Conservation

Cliff White, Missouri Department of Conservation

## SMALL AND MEDIUM TREES

### POST OAK\* *Quercus stellata*

Hardiness zones: 6a-9a  
Height: 40-50 feet  
Spread: 40-50 feet  
Fall color: yellow-brown  
Soil moisture: dry  
Light: full sun  
Growth rate: slow



Paul Wray, Iowa State University, Bugwood.org



Jim Raibert, Missouri Department of Conservation

Post oak is seldom planted but is often found as a native tree in southern Missouri. The foliage is dark green and forms a dense, rounded crown.

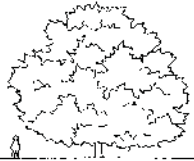
Post oak grows on dry, gravelly soils and on rocky ridges. When it is found in those conditions, it is usually the best species suited for that site

and should be preserved. In good years, fall color is yellow-brown. The acorns produced by this tree are small.

While this tree is difficult to find at a commercial nursery, its hardiness and adaptability make it a wonderful choice.

### SAWTOOTH OAK\* *Quercus acutissima*

Hardiness zones: 5b-9  
Height: 30-40 feet  
Spread: 30-40 feet  
Fall color: yellow-brown  
Soil moisture: wide range  
Light: full sun  
Growth rate: medium



Jim Raibert, Missouri Department of Conservation



Jim Raibert, Missouri Department of Conservation

This oak is becoming more available because transplanting it is easy and it grows in a wide range of soil types and climatic conditions. It would probably do best in southern Missouri.

Growth is somewhat pyramidal when young, but broadens with age.

Lustrous dark green leaves add to summer beauty.

Once established, this oak is fast growing and develops into a medium-sized tree suitable for many urban places. Fall color usually is not showy.

\* Acorns may be a hazard if branches hang over sidewalks and driveways.



## SMALL AND MEDIUM TREES

### *Sophora japonica* JAPANESE PAGODATREE



Hardiness zones: 4b-8  
 Height: 30-50 feet  
 Spread: 30-50 feet  
 Fall color: green  
 Soil moisture: moist  
 Light: full sun  
 Growth rate: medium



A good tree for midsummer flowers is the Japanese pagodatree. Its clusters of cream-white pealike flowers provide conspicuous color during the heat of summer. Young plants grow fast to form trees with wide-spreading crowns.

Bean-like fruits are tubular and long with swollen sections for each seed. Pods may become a nuisance if trees are planted near walks or drives, but are decorative in other areas. Twigs of this tree remain green

to provide winter color, but may be damaged during severe winters or rapid temperature fluctuations.

Japanese pagodatree is tolerant of urban conditions, poor soils, heat and drought. The compound leaves are bright green, giving a good summer display, although without colorful fall foliage. It may be attacked by a few insects or diseases, but none serious, so it may be considered essentially pest free.

Chris Starbuck

Jim Raithert, Missouri Department of Conservation



### *Parrotia persica* PERSIAN PARROTIA



Hardiness zones: 5-8  
 Height: 20-40 feet  
 Spread: 15-30 feet  
 Fall color: orange, red or yellow  
 Soil moisture: wide range  
 Light: full sun to light shade  
 Growth rate: slow



Persian parrotia is one of the best small specimen trees available and is well worth considering. The foliage is reddish purple when unfolding, changing to a lustrous green in the summer. The bark on older branches and the trunk peels in gray, green, white, brown color plates that are attractive in the winter.

The tree prefers well-drained, loamy slightly acidic soils, but will tolerate other growing conditions. It flourishes in full sunlight but can

do well in light shade. The plant will require pruning in the spring to maintain a single stem tree look. Fall color is very showy. The tree is resistant to most pests.

A few cultivars are available. 'Horizontalis' is a semi-weeping tree, with a wide-spreading horizontal branching pattern and good fall color. 'Vanessa' has a truly unique form and assumes an upright, columnar habit when mature. It has reddish new growth tips and good fall color.

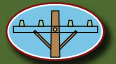
Chris Starbuck

Chris Starbuck



## SMALL AND MEDIUM TREES

### PURPLE-LEAF PLUM *Prunus cerasifera*



Hardiness zones: 5-8  
Height: 15-25 feet  
Spread: 10-25 feet  
Fall color: purple  
Soil moisture: average  
Light: full sun  
Growth rate: fast



Jim Rahter, Missouri Department of Conservation

Purple-leaf plum is best known for its colorful foliage. Trees are easy to transplant and are tolerant of many soils and growing conditions, including heat and drought. They are not pollution or salt tolerant. Plums are subject to cankers, leaf spots, borers, tent caterpillars and a number of other problems that may make them short-lived.

The small, fragrant white to pale pink flowers bloom in early spring and produce small plums that are edible. The small size of the plum

gives them another common name, cherry-plum.

'Newport' and 'Thundercloud' are the most popular cultivars because of their vigor and good purple leaf color that is retained well during the summer. These trees are usually small and low branching.

The purple-leaf sand cherry, *Prunus x cistena*, is a related plant, which also has purple leaf color. While this tree has some colorful characteristics, it is also shortlived, maturing in 20 to 30 years.



Jim Rahter, Missouri Department of Conservation

### EASTERN REDBUD *Cercis canadensis*

Hardiness zones: 4-9  
Height: 20-30 feet  
Spread: 15-30 feet  
Fall color: yellow  
Soil moisture: moist to average  
Light: light shade  
Growth rate: medium



Jim Rahter, Missouri Department of Conservation

Eastern redbud is well-known for its rosy-pink spring flowers in Missouri woodlands. It also can be found growing in the open in old fields and fencerows. It grows best in rich soils, but can tolerate poor sites if they are well-drained. Redbud is relatively pest free, although verticillium wilt sometimes shortens the life-span.

Foliage develops well after flowering, and the pealike pods often persist through the winter.

Redbud trees are abundant seed producers. Many seedling trees may appear in some gardens to the point of being weedy.

'Alba', a cultivar with white flowers, is available that makes an outstanding specimen against an evergreen or dark background. The cultivar 'Forest Pansy' produces new foliage that is deep red-purple, but later turns green.



Guy Stenberg



## SMALL AND MEDIUM TREES

### *Eucommia ulmoides* HARDY RUBBER TREE



Hardiness zones: 5b-7  
Height: 30-50 feet  
Spread: 20-30 feet  
Fall color: green  
Soil moisture: average  
Light: full sun  
Growth rate: medium



The hardy rubber tree develops into a wide-spreading shade tree. It should be planted only in the southern portion of the state or in protected areas since low winter temperature or rapid temperature changes may cause damage.

Rubber tree is pest free, but not extremely pollution tolerant. It

is suited to many different soil types with good drainage and full sun. It can endure drought conditions well and leaves do not scorch easily. Hardy rubber tree is a very uncommon tree that could be planted more.

Chris Starbuck

Jim Rathert, Missouri Department of Conservation



### *Amelanchier arborea* DOWNY SERVICEBERRY



Hardiness zones: 4-9  
Height: 15-30 feet  
Spread: 10-20 feet  
Fall color: yellow to red  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: medium



Among the many species of serviceberries, downy serviceberry is the largest and most tree-like. Most others develop as large shrubs. Leaves are gray-green and turn yellow to red in fall. Showy white flowers are produced very early in spring before the leaves. Bark on the trunk is smooth and light gray.

Serviceberries tolerate light shade, but flower and fruit best in full sun. They are adapted to many soil types and environmental conditions

and are fairly pollution tolerant.

Fruits are dark purple with a bluish bloom, with a resemblance to blueberries. Birds are fond of them. They are edible and flavorful, but rather seedy.

'Autumn Brilliance' is perhaps the most popular cultivar, and is grown mainly for its fall foliage. Other commonly available cultivars include 'Culumus,' 'Princess Diana,' and 'Prince Charles.'

Chris Starbuck

Jim Rathert, Missouri Department of Conservation

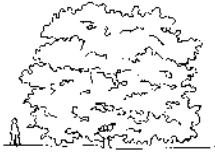


## SMALL AND MEDIUM TREES

### SILVERBELL

*Halesia tetraptera*

Hardiness zones: 5-8  
Height: 30-40 feet  
Spread: 15-25 feet  
Fall color: yellow  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: medium



Chris Starbuck

When in bloom, the hanging bell-shaped white flowers of silverbell are hard to equal. This small tree should be planted on protected sites in light shade where there is plenty of moisture, good drainage and acid soils. General growth of the young

tree is somewhat upright, but growth spreads as it develops.

Silverbell has no significant pest problems and makes a good understory tree for the edge of a wooded area

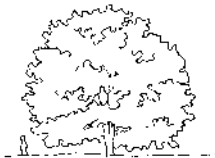


Chris Starbuck

### YELLOWWOOD

*Cladrastis kentukea*

Hardiness zones: 4-8  
Height: 30-50 feet  
Spread: 20-35 feet  
Fall color: yellow  
Soil moisture: moist to average  
Light: full sun  
Growth rate: medium



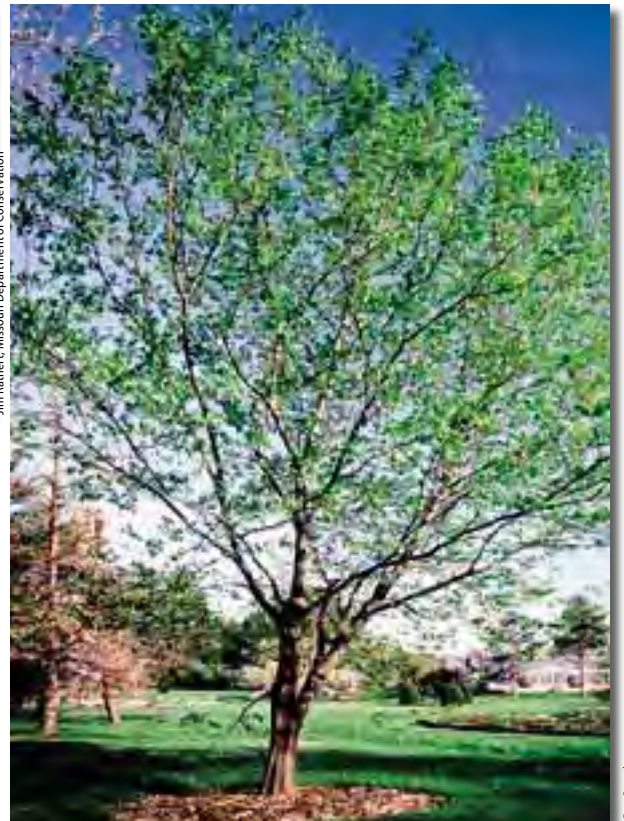
Jim Rathert, Missouri Department of Conservation

Yellowwood is a medium-sized shade tree native to southwest Missouri. The white, pealike flowers hang in long panicles similar to a wisteria bloom.

It does not have serious pest or disease problems. It should be planted in full sun where there is

adequate moisture. Leaves will scorch or drop under drought conditions.

Yellowwood grows well in many soil types and appears able to tolerate low fertility soils. The bark is an unusual, smooth light gray that is distinctive in all seasons.



Guy Sternberg



*Alnus glutinosa* EUROPEAN ALDER



Hardiness zones: 3-7  
 Height: 40-60 feet  
 Spread: 20-30 feet  
 Fall color: green  
 Soil moisture: wide range  
 Light: full sun to light shade  
 Growth rate: fast

The European alder is a fast-growing tree when young. It usually develops a single trunk with an oval-headed crown. It also may be grown with multiple trunks as a landscape feature. The summer foliage is dark, glossy green and tolerates partial shade.

This tree may be planted in wet sites or along waterways, but it also is suitable for drier areas. Alder is a good selection for poor soils and tolerates

both acid or slightly alkaline conditions. The small cones add ornamental value when the tree is dormant.

It is not a tree with serious pests, although woolly alder aphid may be one of the most common damaging insects. Varieties exist with yellow leaves, cut leaves and columnar growth, but they are not readily available.

Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation

*Tilia americana* AMERICAN BASSWOOD



Hardiness zones: 3-8  
 Height: 50-75 feet  
 Spread: 25-40 feet  
 Fall color: yellow  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: medium

American basswood, or linden, is a native tree that becomes quite large. It is best for naturalistic settings, parks or similar large areas. Basswood and other lindens have dense, pyramidal crowns.

It adapts to many soil types and conditions; but without adequate moisture, leaves may scorch in

summer. Several insects and diseases may attack it, causing leaves to drop or be eaten.

A hybrid cultivar of American basswood called 'Redmond' linden is a better selection, which has a pronounced pyramidal form.

Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation



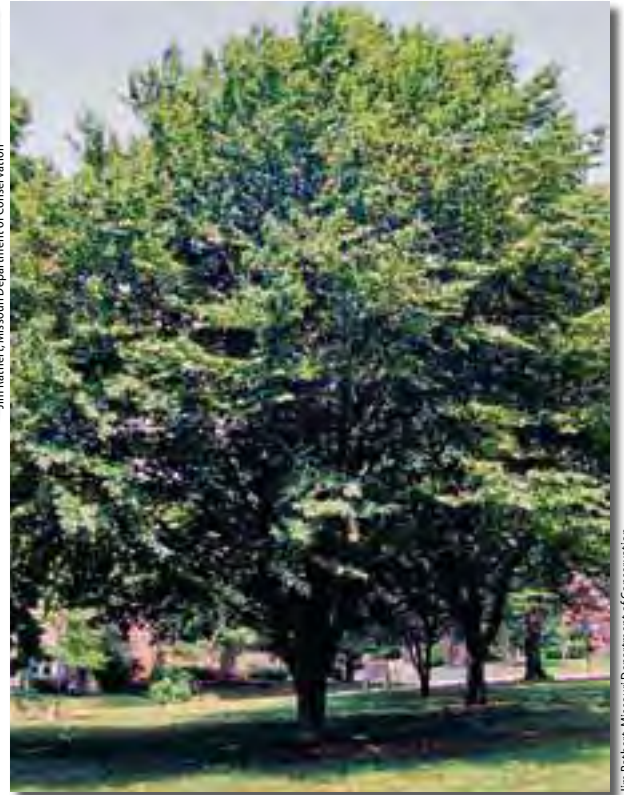
# LARGE SHADE TREES

## AMERICAN BEECH *Fagus grandifolia*

Hardiness zones: 3-8  
Height: 50-75 feet  
Spread: 35-60 feet  
Fall color: yellow-bronze  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: medium



Jim Raibert, Missouri Department of Conservation



Jim Raibert, Missouri Department of Conservation

American beech is a large-growing tree native to forests of the eastern United States and to the Crowley's Ridge portion of southeast Missouri. It is more heat tolerant than the European beech on areas where soils are sandy and well-drained. It is not adapted to clay soils.

This tree becomes very dense with noticeable surface roots when grown in open areas. The glossy leaves and smooth gray bark are outstanding landscape qualities.

## RIVER BIRCH *Betula nigra*

Hardiness zones: 4-9  
Height: 40-60 feet  
Spread: 30-50 feet  
Fall color: yellow  
Soil moisture: moist  
Light: full sun  
Growth rate: medium to fast



Jim Raibert, Missouri Department of Conservation



Jim Raibert, Missouri Department of Conservation

River birch is a native that has gained popularity for planting because of its rapid growth, unique peeling bark and resistance to bronze birch borer. It transplants easily and makes a useful shade tree with either single or multiple trunks. Shade is light, so turf can be grown beneath it.

It cannot be considered a replacement for the European white birch because it does not produce

chalky white bark. However, the cultivar 'Heritage' when young has peeling bark on the trunks and limbs, which show a white to pinkish-white coloring beneath the bark. In addition, this cultivar appears more resistant to leaf spot, a disease that can cause early defoliation. It is an excellent tree for wet locations, but should not be planted in alkaline soils.



# LARGE SHADE TREES

## *Nyssa sylvatica* BLACK GUM



Hardiness zones: 3b-9  
 Height: 40-60 feet  
 Spread: 20-30 feet  
 Fall color: orange to deep scarlet  
 Soil moisture: wide range  
 Light: full sun to light shade  
 Growth rate: slow



Black gum, also known as sour gum or tupelo, is native to the southeastern third of the state. Foliage is glossy, deep green and matures to outstanding fall color from orange to deep scarlet.

Flowers are not showy, and the blue-black fruits in fall are ornamental for only a short time before birds and other wildlife eat them. The shape of a young tree is pyramidal, which becomes oval on older trees.

Black gum is sometimes slow to become established after transplanting, so after-planting care is important. Once established, trees require little care other than watering during drought.

Although a slow-growing tree, black gum deserves to be planted more often. Black gum can be considered essentially pest free, since the few pests that may attack it are not serious. It tolerates urban growing conditions.

Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation

## *Gymnocladus dioica* KENTUCKY COFFEETREE



Hardiness zones: 3-8  
 Height: 60-75 feet  
 Spread: 40-60 feet  
 Fall color: yellow  
 Soil moisture: average  
 Light: full sun  
 Growth rate: medium



Kentucky coffeetree is a native tree well-suited to large open spaces. Branches and twigs are coarse, making it distinctive and easily identified in winter. The small leaflets give the tree a medium texture in summer.

Mature trees are broad-spreading with an almost rounded form, but young trees are more upright and oval. Although it grows best in rich soil, it is adapted to many soil types and conditions. It also withstands city conditions and pollution.

Female trees produce bean pods that hang on the tree through the winter. The main leaf stem of each compound leaf may be 2 feet long and drops from the tree after the leaflets.

Kentucky coffeetree breaks dormancy late in the spring. Fall color is yellow, but not usually long lasting. Overall, the tree is durable and long-lived.

Chris Starbuck

Chris Starbuck



# LARGE SHADE TREES

## CUCUMBERTREE *Magnolia acuminata*

Hardiness zones: 4-8  
Height: 50-60 feet  
Spread: 40-60 feet  
Fall color: yellow-green  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: medium



Jim Rathert, Missouri Department of Conservation

Often called the cucumbertree magnolia, this is an impressive large, broad-spreading shade tree native to southeastern Missouri. Leaves are large and provide dense shade; however, it does not survive drought or polluted conditions well.

Greenish-white flowers are produced in late spring among the leaves, followed by fruit that looks somewhat like cucumbers. It is pest free, but should be used in landscapes or parks where summer care and watering is possible.



Chris Starbuck

## AMERICAN ELM *Ulmus americana*

Hardiness zones: 5-7  
Height: 50-70 feet  
Spread: 50-70 feet  
Fall color: yellow  
Soil moisture: wide range  
Light: full sun  
Growth rate: fast



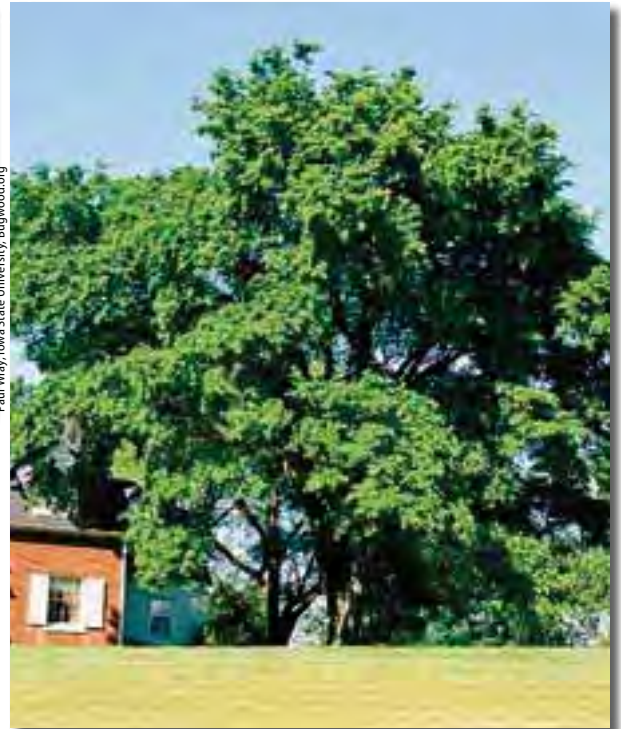
Paul Wray, Iowa State University, Bugwood.org

During the 1950s and 1960s, Missouri and the nation were ravaged by Dutch elm disease. Due to the continued pressure of Dutch elm disease, only those cultivars which have been genetically selected to have some resistance should be planted.

Note: Cultivars that are resistant to Dutch elm disease are not necessarily immune to other diseases. 'Valley Forge,' introduced by the U.S. National Arboretum, is probably the best choice due to its high resistance to Dutch elm disease. The growth form is highly

reminiscent of the classic American elm—upright-arching and vase-shaped to 70 feet tall and 60 feet wide. 'Jefferson' shows good resistance to disease and grows to 50 feet tall and wide with a vase-shape and arching branches.

'Princeton' bears handsome foliage and has shown good resistance to Dutch elm disease. It grows quickly and is becoming more commonly available. It forms the traditional vase shape, to 70 feet tall and 50 feet wide.



Jim Rathert, Missouri Department of Conservation



# LARGE SHADE TREES

## *Ginkgo biloba* GINKGO



Hardiness zones: 3b-9  
 Height: 50-60 feet  
 Spread: 30-40 feet  
 Fall color: bright yellow  
 Soil moisture: average  
 Light: full sun to light shade  
 Growth rate: slow to medium



Ginkgo is an outstanding city tree because of its pollution and salt tolerance. It has open branching that allows enough sunlight to penetrate to maintain a lawn.

Young trees usually have a pyramidal shape, but old trees can be very wide-spreading. It is tolerant of many soil conditions, although best growth occurs in well-drained soils with adequate moisture.

Female trees produce apricot-colored fruit, which is messy and

produces an undesirable odor. When grown from seed, there is no means of identifying a tree's sex until it begins flowering, which may take 20 years.

Known cultivars should be used whenever fruit would be objectionable or where uniform growth form is needed. 'Autumn Gold' is an excellent male cultivar with a pyramidal shape.

Matt Seek, Missouri Department of Conservation

Courtesy Missouri Botanical Garden PlantFinder

## *Gleditsia triacanthos var. inermis*

## THORNLESS HONEYLOCUST



Hardiness zones: 3-9  
 Height: 30-60 feet  
 Spread: 25-50 feet  
 Fall color: yellow  
 Soil moisture: wide range  
 Light: full sun  
 Growth rate: fast



Cultivated varieties of honeylocust are commonly used for urban planting. The open, spreading crown with very small leaflets creates filtered sunlight. The light shade it produces allows a lawn to be grown beneath it. It is very tolerant of many soil conditions, and has salt tolerance for use near highways.

The long, curved pods can litter the ground, so cultivars with mainly male flowers that are essentially podless should be used. Several insects

and diseases may affect honeylocust trees. Therefore, the trees should be used only where control measures may be applied when necessary.

Only cultivars that are thornless are commercially available. 'Moraine' has no thorns or seed pods. 'Imperial,' 'Shademaster' and 'Skyline' have seed pods, but no thorns. 'Sunburst' has yellow foliage that gradually turns green, but can be damaged by mimosa webworm and stem cankers.

Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation



# LARGE SHADE TREES

## EUROPEAN HORNBEAM *Carpinus betulus*

Hardiness zones: 4b-7  
Height: 40-60 feet  
Spread: 20-40 feet  
Fall color: yellow-green  
Soil moisture: average  
Light: full sun to light shade  
Growth rate: medium



Cliff White, Missouri Department of Conservation



Cliff White, Missouri Department of Conservation

Although not widely available, European hornbeam is a good choice for stressful climates and urban sites. Besides being very adaptable to different soils and environmental conditions, it is essentially pest free. Leaves are dark green and develop a good yellow fall color.

Although several cultivars exist, the one used most often is an upright growing form called 'Fastigiata'. It has a dense growth that makes it useful

for a tall screen. Small trees planted close together may be used to form a tall hedge since this plant tolerates shearing. Single trees make excellent specimens with low maintenance.

A close relative, the American hornbeam or musclewood, *Carpinus caroliniana*, is also a durable and well-adapted tree. It has attractive smooth gray bark and yellow or orange fall color.

## HORSECHESTNUT *Aesculus hippocastanum*

Hardiness zones: 3b-7  
Height: 40-60 feet  
Spread: 25-50 feet  
Fall color: yellow  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: medium



Dr. Barbara Rothenberger



Chris Starbuck

Horsechestnut and buckeye are close relatives that require about the same conditions and are affected by the same problems. Horsechestnut has larger leaves and grows more upright with an oval shape.

Flowers are white in upright panicles backed by the foliage. They

need moisture in the heat of summer and can be damaged by drought. The fruit can be a litter nuisance.

The cultivar 'Baumannii' has double flowers and does not produce fruit. Hybrids combining horsechestnut and buckeye are sometimes available.



# LARGE SHADE TREES

## *Cercidiphyllum japonicum* KATSURA



Hardiness zones: 5-8  
 Height: 40-60 feet  
 Spread: 25-50 feet  
 Fall color: yellow  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: medium



This is a relatively unknown species, which forms a medium to large shade tree with unique bluish-green leaves. It is adaptable to many soil types and environmental conditions.

It grows best in deep, moist soils. Summer moisture is important

while trees are young. Katsura is slow to become established after transplanting, but once established it grows fairly fast.

It is essentially free of any insect or disease problems. Fall color is yellow to apricot.

## *Tilia cordata* LITTLELEAF LINDEN



Hardiness zones: 3b-7a  
 Height: 50-70 feet  
 Spread: 25-40 feet  
 Fall color: yellow-green  
 Soil moisture: moist  
 Light: full sun to light shade  
 Growth rate: slow to medium



Littleleaf linden's dark green leaves and dense pyramidal growth make it a suitable choice when a formal-looking tree is desired.

Lindens may be damaged during a summer of extreme heat and drought. However, they recover well and are suitable for street trees as well as mall parking lots and other difficult sites. Growth is slow when they are planted in such areas, and

watering during stress periods is important.

Fragrant summer flowers are attractive to bees. Individuals sensitive to bees should not plant lindens near an outdoor living area. Several insects and diseases may attack lindens and require control.

Many good cultivars exist. 'Greenspire' is one of the most popular and best.



# LARGE SHADE TREES

## RED MAPLE *Acer rubrum*

Hardiness zones: 3-9  
Height: 40-70 feet  
Spread: 30-50 feet  
Fall color: red to yellow  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: medium to fast



Keith Kenoit, Maine Forest Service, Bugwood.org



Robert L. Anderson, USDA Forest Service, Bugwood.org

Red maple is most often planted for its spectacular fall color. Tree shape is oval when young, but becomes wider spreading with age. Red maple is easy to transplant and tolerant of many soil conditions.

This is a tree suitable for poorly drained sites as well as drier soil conditions. Alkaline soils cause stunted growth and pale yellow leaves with green veins. Leaf scorch may be a problem without irrigation during hot, dry summers. Red maple

has a tolerance to urban pollutants such as ozone and sulfur dioxide.

The small, red flowers are not highly showy, but are a welcoming sign of spring. The bark is a smooth gray-brown.

Many cultivars are available. 'Red Sunset,' 'Autumn Flame' and 'October Glory' were developed for fall color. 'Autumn Blaze' is a red-silver maple hybrid with fall color. Red maples without cultivar names may produce only dull yellow fall foliage.

## SUGAR MAPLE *Acer saccharum*

Hardiness zones: 4-8  
Height: 60-80 feet  
Spread: 40-60 feet  
Fall color: red to yellow  
Soil moisture: moist to average  
Light: full sun to light shade  
Growth rate: slow to medium



Jim Rathert, Missouri Department of Conservation



Jim Rathert, Missouri Department of Conservation

Sugar maple becomes a very large shade tree that is well-known for fall colors. It is less pollution tolerant than red maple, especially to de-icing salts along roadways.

Sugar maple thrives in deep, rich soils. It tolerates poor sites with good drainage, but grows slowly. It needs plenty of space and should be used in large yards, parks, golf courses or similar locations.

In shallow soils and other poor sites, leaf scorch may develop during dry periods. Its dense shade and shallow roots prevent a good lawn from growing beneath it. Sugar maple is tolerant of shade and can be used near taller trees or buildings. Many cultivars exist to provide a variety of shapes, fall color and drought tolerance, such as 'Bonfire,' 'Caddo,' 'Green Mountain,' and 'Legacy.'



# LARGE SHADE TREES

## *Quercus macrocarpa* BUR OAK\*

Jim Rathert, Missouri Department of Conservation



Jim Rathert, Missouri Department of Conservation



Hardiness zones: 3a-9a  
 Height: 70-80 feet  
 Spread: 70-80 feet  
 Fall color: yellow-brown  
 Soil moisture: wide range  
 Light: full sun  
 Growth rate: slow



Bur oak is a native species that grows statewide on both upland and bottomland soils, although its best growth is on moist, well-drained soils. It can grow in dry soils and is more tolerant of urban conditions than most other oaks.

It is slow growing and difficult to transplant. Irrigation and fertilization can speed growth of younger trees. Insect and disease problems are minor.

Bur oak produces the largest acorn of any of the oaks: up to 1 1/2 inches in diameter. The large acorns are loved by wildlife but may be a nuisance in lawns.

The mature size of bur oak may be too large for the average home landscape, but it makes an excellent tree for parks or other areas where it has room to grow.

## CHESTNUT OAKS\*

Chris Evans, River to River CWMMA, Bugwood.org



Wendy VanDyk Evans, Bugwood.org



Hardiness zones: 4-8  
 Height: 50-70 feet  
 Spread: 40-70 feet  
 Fall color: yellow-brown  
 Soil moisture: moist to average  
 Light: full sun  
 Growth rate: medium



**Swamp chestnut oak**  
*Quercus michauxii*

**Chestnut oak**  
*Quercus prinus*

These two oaks are very similar, but chestnut oak does better as an ornamental tree because it adapts well to many soil types and upland conditions. Swamp chestnut oak

grows larger and should be selected for landscapes in low, wet areas.

Leaf color is light green. Trees develop oval to round canopies. These oaks are very useful for attracting wildlife that are fond of acorns.

While these two oaks are difficult to find at a commercial nursery, they are good choices for landscaping.

\* Acorns may be a hazard if branches hang over sidewalks and driveways.



# LARGE SHADE TREES

## CHINKAPIN OAK★ *Quercus muehlenbergii*

Hardiness zones: 5b-7  
Height: 40-60 feet  
Spread: 50-60 feet  
Fall color: yellow  
Soil moisture: dry  
Light: full sun  
Growth rate: medium



Chinkapin oak is most suitable for planting in central and southern Missouri. Like many oaks in the white oak group, transplanting it is difficult.

It is more tolerant of alkaline soil conditions than most oaks, but also

grows well in acid soils. It is seldom available for sale, but should be preserved on developed sites.



Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation

## ENGLISH OAK★ *Quercus robur*

Hardiness zones: 4-8  
Height: 40-60 feet  
Spread: 10-40 feet  
Fall color: brown  
Soil moisture: average  
Light: full sun  
Growth rate: medium



English oak has gained popularity primarily because of the more upright and columnar cultivars that are available. For a tall, narrow screen, these upright selections are more durable choices than upright poplars.

The crown of the more typical English oak is pyramidal when young, but becomes rounded with age. Leaves are dark green with rounded lobes somewhat like our native white

oak. English oak is easy to transplant, and adapts to many soil conditions, but must have good drainage. Fall foliage is not colorful. Brown leaves are often held through the winter.

Pests are not a major problem although mildew can cover leaves in late summer and fall. Acorns are produced freely, so this oak should not be planted where branches hang over walks, driveways or streets.



Jim Rathert, Missouri Department of Conservation

Cliff White, Missouri Department of Conservation

\* Acorns may be a hazard if branches hang over sidewalks and driveways.



*Quercus rubra* NORTHERN RED OAK\*



Cliff White, Missouri Department of Conservation



Jim Rathert, Missouri Department of Conservation

Hardiness zones: 4-8  
 Height: 60-80 feet  
 Spread: 60-80 feet  
 Fall color: red  
 Soil moisture: average  
 Light: full sun  
 Growth rate: medium to fast



An outstanding oak for landscaping is the northern red oak. It becomes a large tree with a rounded, wide-spreading crown. As a mature tree it is among the most majestic of the oaks. Since it grows large, it needs plenty of space.

Northern red oak is easy to get established, and it is tolerant of urban pollution. Unlike pin oak, which is more widely planted, it is not as sensitive to

soil conditions and is less likely to suffer leaf yellowing and poor growth. It is fast growing and ideal for parks, golf courses and other large areas.

Leaf galls or leaf feeding insects may attack it, but most pests are not serious. All species in the red oak group are susceptible to a very destructive fungus disease called oak wilt, for which there is no cure.

*Quercus coccinea* SCARLET OAK\*



Chris Starbuck



Jim Rathert, Missouri Department of Conservation

Hardiness zones: 4-8  
 Height: 60-80 feet  
 Spread: 30-50 feet  
 Fall color: russet to red  
 Soil moisture: average  
 Light: full sun  
 Growth rate: medium



Although scarlet oak has been relatively uncommon for landscape planting, it is gaining popularity and is more available. It is pyramidal to oval when young and the canopy broadens with maturity.

The main reason for planting this oak is its spectacular scarlet fall color. It is somewhat slower to establish than pin oak and red oak. It is tolerant of many conditions but is not as pollution tolerant as red oak.

As an older tree, the branch

structure becomes open as smaller branches are shaded out, sometimes giving a twiggy character to the inner trunk. Since this oak becomes quite large, it is best used in areas with plenty of space.

Scarlet oak has no serious pest problems, but it is subject to many of the same pests that attack other oaks. While it grows most rapidly on deep, moist soils, it is also very tolerant of dry conditions.

\* Acorns may be a hazard if branches hang over sidewalks and driveways.



# LARGE SHADE TREES

## SHUMARD OAK\* *Quercus shumardii*

Hardiness zones: 5b-9  
Height: 50-75 feet  
Spread: 40-75 feet  
Fall color: red  
Soil moisture: average  
Light: full sun  
Growth rate: medium



Shumard oak is one of the least common of the oaks used in landscape plantings. It becomes a large tree with similarities to pin, scarlet and red oak, and like them is most useful in large open areas.

Growth when young is like pin oak, but mature structure is more like scarlet oak. The leaves are variable and might be confused with pin, red or scarlet oak.

Shumard oak is tolerant of many soils and environmental conditions. Because of good drought tolerance, it is well-suited to the low-maintenance landscape where irrigation of any type is not possible during drought periods. It has non-serious pest problems, but is subject to general pests of the other oaks.



Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation

## SOUTHERN RED OAKS\*

Hardiness zones: 6b-9  
Height: 50-70 feet  
Spread: 40-70 feet  
Fall color: brown  
Soil moisture: moist  
Light: full sun  
Growth rate: medium



**Southern red oak**  
*Quercus falcata*

**Cherrybark oak**  
*Quercus falcata var. pagodifolia*

These oaks are not commonly available for sale, but are native to southeast Missouri. They become

large shade trees with broad, rounded canopies. Leaves are a lustrous, deep green that makes them stand out in summer. Fall color is usually not showy in these trees. In central Missouri winter damage is possible, but they are excellent oaks for southern areas. They can endure poor, dry soils.



Jim Rathert, Missouri Department of Conservation

Jim Rathert, Missouri Department of Conservation

\* Acorns may be a hazard if branches hang over sidewalks and driveways.



*Quercus bicolor* SWAMP WHITE OAK\*



Hardiness zones: 3-8  
 Height: 50-80 feet  
 Spread: 40-70 feet  
 Fall color: yellow  
 Soil moisture: moist  
 Light: full sun  
 Growth rate: medium

The swamp white oak is a native tree that becomes quite large and spreading. Most oaks within the white oak group are difficult to transplant, but swamp white oak is one of the least difficult.

As the name implies, it is well adapted to low, moist conditions and bottomlands. In spite of this quality, this tree is able to endure drought conditions once it's well established.

Leaves are dark green above and soft gray on the underside. It grows

best in deep soils, but is adapted to many soil types and conditions including dense urban clay soils. Alkaline soils will cause leaf yellowing and growth problems. Fall color is a weak yellow and not outstanding.

Pests are not serious enough to discourage planting, but controls sometimes may be needed to maintain attractiveness.

Jim Balthert, Missouri Department of Conservation

Jim Balthert, Missouri Department of Conservation

*Quercus nigra* WATER OAK\*



Hardiness zones: 6b-9  
 Height: 50-75 feet  
 Spread: 35-60 feet  
 Fall color: green  
 Soil moisture: wide range  
 Light: full sun to light shade  
 Growth rate: medium to fast

Water oak is suitable only for the southern part of the state. It is easy to transplant and is best adapted to low sites with moist or wet soil conditions. It is fast growing, but the wood is more subject to storm and ice breakage than many other oaks.

Leaves are held long into the fall, and fall color is not significant. Since there are better oaks for uplands, its use should be reserved for low wet areas where most other oaks will not grow.

Guy Sternberg

Jim Balthert, Missouri Department of Conservation

\* Acorns may be a hazard if branches hang over sidewalks and driveways.



# LARGE SHADE TREES

## WHITE OAK\* *Quercus alba*

Hardiness zones: 4b-9a  
Height: 70-90 feet  
Spread: 50-80 feet  
Fall color: reddish-purple  
Soil moisture: moist to dry  
Light: full sun  
Growth rate: slow



Chris Starbuck

White oak is an important lumber tree in Missouri but also makes a beautiful shade tree. It is found on many types of soil but grows best on deep, moist, well-drained soils. Foliage is blue-green to dark green in summer and turns to a reddish-purple in fall.

White oak is sensitive to grade changes and other construction damage, so large specimens are not commonly found on developed sites. It is somewhat difficult to transplant

because of its deep tap root. Small trees should be transplanted as balled and burlapped stock. Its slow growth can be increased by fertilization and irrigation during dry periods.

Insect and disease problems are minor. White oak is more resistant to oak wilt than the red oaks. White oak should receive high priority for protection during home construction since it is very sensitive to disturbances.



Jim Rathert, Missouri Department of Conservation

## WILLOW OAK\* *Quercus phellos*

Hardiness zones: 5b-9  
Height: 50-70 feet  
Spread: 40-60 feet  
Fall color: yellow-brown  
Soil moisture: wide range  
Light: full sun  
Growth rate: medium



Jim Rathert, Missouri Department of Conservation

Willow oak has not been a common landscape tree, but continues to gain popularity. Small leaves produce a fine texture for an oak. The small acorns are not a serious litter problem.

This oak is less hardy than most other species, but can be grown throughout the state. In more northern locations twig damage might be expected after very severe winters.

Young trees have a pyramidal shape that is maintained for many

years until it approaches maturity. It then becomes a wide-spreading tree with a rounded crown.

Transplanting it is easy. In colder climates it should be planted in spring so it becomes well-established before winter cold arrives. It is suited to many soils and sites and is fairly drought tolerant.



Jim Rathert, Missouri Department of Conservation

\* Acorns may be a hazard if branches hang over sidewalks and driveways.



# LARGE SHADE TREES

## *Carya illinoensis* PECAN



Courtesy Missouri Botanical Garden Plant Finder



Jim Rather, Missouri Department of Conservation

Hardiness zones: 5b-9  
Height: 50-70 feet  
Spread: 40-70 feet  
Fall color: yellow  
Soil moisture: moist  
Light: full sun  
Growth rate: slow



Pecans make attractive large-spreading landscape trees. Their only landscape disadvantage may be litter from nut husks. Since these nuts are edible, however, many homeowners are willing to accept this clutter during harvest.

Like other hickories, they develop a taproot that makes transplanting difficult. Southern varieties will not fill nuts well in most of the state, so more northern varieties should be selected. A few of these are 'Hardy Giant,' 'Major' and 'Colby.'

## *Oxydendrum arboreum* SOURWOOD, SORREL TREE



Chris Starbuck



Jim Rather, Missouri Department of Conservation

Hardiness zones: 5b-9  
Height: 50-60 feet  
Spread: 15-20 feet  
Fall color: yellow to red to purple  
Soil moisture: moist  
Light: full sun to light shade  
Growth rate: slow



Sourwood is a forest tree of the eastern United States that is not commonly planted in Missouri. It should be planted when small and placed in partial shade in acid soils. Drought can be damaging, so in our climate it may require irrigation.

Because of the drooping clusters of white flowers in midsummer, the

tree is also called lily-of-the-valley tree. Flowers and seed structures contrast well with the foliage. Fall color develops early and leaves turn an outstanding red. This tree has few insect and disease problems.



# LARGE SHADE TREES

## SWEETGUM *Liquidambar styraciflua*

Hardiness zones: 5b-9  
 Height: 60-75 feet  
 Spread: 40-60 feet  
 Fall color: yellow to red  
 Soil moisture: moist  
 Light: full sun  
 Growth rate: medium



Jim Raibert, Missouri Department of Conservation



Jim Raibert, Missouri Department of Conservation

Sweetgum, which is native to the southern United States, has been widely planted as a yard and park tree. It grows slowly after planting, but grows more rapidly once established. Sweetgum adapts to many conditions, but grows best in deep, moist soils.

The spiny, round seed capsules can be produced heavily in some years, so this tree should not be used near walks, drives or play areas where the "gumballs" may become a problem. A seedless cultivar has been developed,

but is still not generally available.

Sweetgum develops pyramidal growth with glossy, starlike leaves. Fall color is variable. Leaves may become yellow, orange or shades of red. Some trees never develop fall color. Sweetgum is relatively pest free, but a few insects may feed on leaves. A problem called bleeding necrosis may attack the trunks or branches of older trees. Severe winters may cause some twig damage and contribute to sun scalding of the trunk.

## AMERICAN SYCAMORE *Platanus occidentalis*

Hardiness zones: 4-9  
 Height: 70-100 feet  
 Spread: 60-80 feet  
 Fall color: brown  
 Soil moisture: moist  
 Light: full sun  
 Growth rate: fast



Allen Bridgman, South Carolina Department of Natural Resources, Bugwood.org



Jim Raibert, Missouri Department of Conservation

American sycamore is one of our largest native trees. For that reason it never should be planted unless it has plenty of growing space. Peeling bark reveals, white, cream or gray areas along the trunk or branches. This is a tree best suited to naturalist landscapes. It may drop leaves during the summer, as well as twigs and seed balls, causing a need for constant clean-up.

Although many pests attack sycamore, only one, sycamore anthracnose, is really serious.

Anthrachnose causes leaves and twigs to die in spring. It is most serious in cool, wet springs and in low, wet areas.

### London planetree

The London planetree, a hybrid between the American and Oriental sycamore is more resistant. Where the look of a sycamore is desired, the London planetree is preferred to the American sycamore. 'Bloodgood,' 'Columbia' and 'Liberty' are disease-resistant cultivars.

*London planetree*

Hardiness zones: 6a-9a  
 Height: 70-90 feet  
 Spread: 65-80 feet  
 Fall color: yellow-brown  
 Soil moisture: wide range  
 Light: full sun to light shade  
 Growth rate: medium



*Liriodendron tulipifera* TULIPTREE

Jim Rathert, Missouri Department of Conservation



Jim Rathert, Missouri Department of Conservation



Hardiness zones: 4b-9  
 Height: 70-100 feet  
 Spread: 35-50 feet  
 Fall color: yellow  
 Soil moisture: moist  
 Light: full sun  
 Growth rate: fast



Tuliptree is native to deep, moist soils of southeast Missouri. It is sometimes called tulip magnolia because the flowers are tulip-shaped, and because it is related to the magnolia family. It is also called yellow-poplar or tulip-poplar due to its fast poplar-like growth, although it is not related to poplar.

Shape is pyramidal in young trees, becoming more irregular in older trees. Growth is very rapid when young. It is not suited to shallow, rocky soils. Severe drought can cause substantial

damage without irrigation.

Several insects may attack it, but do not usually cause serious damage. Aphids cause abundant leaf drop that can be unsightly on the lawn and require extra clean-up. Branches are somewhat weak, so storm damage is possible.

The flowers are beautiful, but because they are greenish-yellow and hidden in the leaves, they often go unnoticed.

*Zelkova serrata* JAPANESE ZELKOVA

Matt Seek, Missouri Department of Conservation



Cliff White, Missouri Department of Conservation



Hardiness zones: 5b-8  
 Height: 40-60 feet  
 Spread: 40-60 feet  
 Fall color: yellow-brown  
 Soil moisture: moist  
 Light: full sun  
 Growth rate: medium



Since the American elm first succumbed to Dutch elm disease, there has been a search for a replacement. Zelkova is not a perfect substitute, but is a relative with a vase-shaped form resembling American elm.

Leaves are dark green and held late into the fall, essentially without fall color. Zelkova's angular branching allows its use along walks, streets or other areas where low branching is undesirable.

It has good pollution, wind and drought tolerance. Although it is closely related to elms, it appears to be fairly resistant to Dutch elm disease.

Because many gardeners are unfamiliar with zelkova, it has been used very little, but it is gaining popularity and becoming more available. Several cultivars have been developed, but are not widely distributed. One outstanding cultivar is 'Green Vase,' which features vigorous growth and bronzy-red fall foliage.

# UNDESIRABLE TREES FOR LANDSCAPE PLANTING

Each of the following trees has one or more problems that usually make it undesirable for planting near homes. These problems may include brittle wood and

structural weakness, serious insect or disease problems, nuisance fruits or nuts, or general messiness. Undesirable characteristics are noted in each species description.

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## GREEN ASH

### *Fraxinus pennsylvanica*

Green ash grows fairly fast, developing a pyramidal shape when young, but it soon forms into a wide-spreading round-topped tree. As trees age, inner twigs often are shaded out and die. These dead twigs may drop during storms. Ash borer is the most serious insect pest, which may cause branches to die, affecting the trees ornamental value. Seeds are abundantly produced on female trees and may become weedy. Emerald ash borer is a serious pest which will kill the tree.

## WHITE ASH

### *Fraxinus americana*

White ash tends to develop into an oval shape. This species is susceptible to the same pests as green ash, but ash borer is sometimes more damaging, possibly because growth is slightly slower. Ash flower gall, caused by a mite, attacks male flowers, resulting in abnormal growth. Unattractive galls persist, making the tree less ornamental. Emerald ash borer is a serious pest which will kill the tree.

## EUROPEAN WHITE BIRCH

### *Betula pendula*

European white birch was once popular due to its showy white bark. Its popularity has been lessened by an insect called the bronze birch borer. This pest moves into the tops of trees and works downward. It can be controlled by frequent use of insecticides, but most home gardeners cannot keep up with the frequency needed. Some beautiful trees still exist in isolated areas, but planting this species for long-term survival is questionable.

## BOXELDER

### *Acer negundo*

Boxelder is a fast-growing invader species that is weak-wooded and breaks up easily in windstorms or under ice and snow weight. It attracts an insect called the boxelder beetle that is not damaging to the tree, but finds hiding places in homes during the fall and winter and can become a nuisance. Some trees are heavy seed producers.

## NORTHERN CATALPA

### *Catalpa speciosa*

Catalpa does not rank high among landscape trees because of its coarse appearance and bean pods. Also, the catalpa sphinx moth larvae feed upon its leaves.

## BLACK CHERRY

### *Prunus serotina*

Black cherry is a common native tree. Birds are fond of the fruit and spread the seeds. In yards and parks, the abundant fruit and seed production may be a disadvantage because of fruit mess and weediness. This is an important timber tree and can be useful in naturalistic areas. The oval crown has drooping branches that give it a graceful look. Fall color is often an excellent wine or red. It may be attacked by tent caterpillars.

## SIBERIAN ELM

### *Ulmus pumila*

This fast-growing elm, incorrectly called Chinese elm, was once introduced as a replacement for the American elm because it is resistant to Dutch elm disease. It is seriously attacked by both larvae and adult forms of elm leaf beetles, which give the tree a perpetually unattractive appearance throughout most of the summer. Its weak wood breaks up easily in storms or under the weight of ice. If that is not enough, it is also a prolific seeder. Don't plant it.

## COMMON HACKBERRY

### *Celtis occidentalis*

Common hackberry is extremely tolerant of adverse conditions, but is not one of the best landscape trees. Trees become large and wide-spreading with drooping branches. It is attacked by a wide range of pest, but they are not serious. Two of the most disfiguring are witches' broom, which causes clusters of twiggy growth, and nipple gall that can cover leaves with large bumps.

## HICKORY

While there are a number of species of native hickory, it is not an important landscape tree because all species are difficult to transplant and the nuts cause clutter in lawns.

## BLACK LOCUST

### *Robinia pseudoacacia*

Black locust produces pendulous clusters of fragrant white flowers that attract attention in spring. It also has value for growing on very poor soils. A disadvantage is that it has brittle wood and breaks up easily in storms. It also tends to root sucker and become somewhat weedy. Black locust is short lived because of attacks by borers and other pests.



## SILVER MAPLE

### *Acer saccharinum*

This maple can be found on streets and in yards statewide. Seedlings and volunteer trees appear almost anywhere. It grows rapidly and becomes too large for most urban spaces. Its greatest problem is weak branch unions that split and break easily during windstorms or under winter ice and snow.

## MIMOSA

### *Albizia julibrissin*

Mimosa's most outstanding feature is its showy, fluffy pink summer flowers. Throughout Missouri, except in southern areas, twigs and branches may be killed by winter cold. Sometimes entire trees die back to the ground. A prolific seed producer, the seedlings may become weedy. It also is subject to a vascular disease known as mimosa wilt that may kill trees. Several insect pests, such as mimosa webworm, can ruin its ornamental value in summer.

## MOUNTAINASH

### *Sorbus aucuparia*

This small tree is common in cooler climates, but suffers from Missouri heat and drought. It is bothered by several pests and diseases, the most damaging of which is fire blight. This bacterial disease causes serious dieback and cankers that may disfigure or kill the tree.

## MULBERRY

### WHITE MULBERRY

#### *Morus alba*

### RED MULBERRY

#### *Morus rubra*

Both mulberries may be found growing in the wild, but white mulberry is most common. Their major landscape problems are messiness of the fruits and weediness. Fruitless male cultivars of white mulberry are sometimes found. Weeping forms of these trees have been more widely accepted for planting.

## PIN OAK

### *Quercus palustris*

Pin oak has few pest problems other than leaf gall and some general pests that seldom need control measures. It is not a good choice for planting near walks, driveways or streets because drooping branches will continually interfere with clearance below the tree. Even when lower branches are removed, higher ones will begin to droop to take their place.

## SHINGLE OAK

### *Quercus imbricaria*

Shingle oak is a native tree once used to make shingles. It is less used in home landscapes and, like pin oak, it has a tendency to droop its lower branches, making it less desirable near streets or walks where clearance is needed. Winter leaf retention requires leaf clean up in spring. Twig galls will affect some trees and disfigure them.

## RUSSIAN OLIVE

### *Elaeagnus angustifolia*

Its silvery-gray foliage made the Russian olive a popular tree for many years. It is useful in drier climates, but several diseases make it undependable in Missouri. This tree can invade surrounding areas and has potential to become a pest.

## OSAGE - ORANGE

### *Maclura pomifera*

This tough, durable tree was once commonly used for hedgerows to contain livestock and for wind-erosion control. In urban areas it is less desirable, primarily because of the large fruits, low-hanging branches and thorns. Thornless, fruitless cultivars have been developed but are not generally available.

## PAWPAW

### *Asimina triloba*

Pawpaw is a small native tree that may be grown in full sun or in shade. It is generally not available because establishing it is difficult. The fruits are edible, but can be messy in an urban area.

## CALLERY PEAR

### *Pyrus calleryana*

Sometimes the variety name of a tree becomes so popular that the species is known almost solely by that name. This is the case with the widely planted 'Bradford' callery pear. This species tends to produce heavy limbs with narrow branch unions that break easily in storms or under the weight of ice.

## PERSIMMON

### *Diospyros virginiana*

Persimmon is a native tree found most often in fencerows and old pastures. The leaves are a shiny, dark green. The bark on older trees breaks into attractive black, squarish blocks. The fruit, which is consumed by wildlife and humans alike, is messy and the major reason for not planting persimmon around homes. It also is difficult to transplant.

## AUSTRIAN PINE

### *Pinus nigra*

This pine has been popular for yard and public plantings for many years. However, a serious needle disease called Diplodia tip blight has infected many trees, causing die-back of branches and, at times, death of trees. Large infected trees are almost impossible to cure with fungicides.

## SCOTCH PINE

### *Pinus sylvestris*

This pine is well-known for use as a Christmas tree and has been widely planted for a screen or specimen tree. Unfortunately, it is susceptible to the pine wilt nematode that has spread through the region in recent years. The nematode has no control and is spread by insects to attack other pines, so dead and dying trees should be promptly removed. Stress conditions such as heat and drought can prompt nematode damage.

## POPLAR

### EASTERN COTTONWOOD

*Populus deltoides*

### LOMBARDY POPLAR

*Populus nigra 'Italica'*

These poplars, as well as their relatives the aspens, are fast-growing trees that are weak-wooded and relatively short-lived on most growing sites. Canker diseases of the branches and trunk, such as *Dothichiza* canker and *Cytospora*, can be the most serious. Female cottonwoods produce "fuzz" in the spring that can be a nuisance. Cottonwood is sometimes planted for a park tree in areas susceptible to flooding.

## TREE-OF-HEAVEN

*Ailanthus altissima*

Tree-of-Heaven is a rapid-growing exotic that has become common in urban areas. Because of its weediness and brittle wood, it is not recommended for planting. Some people also experience skin irritations after coming into contact with this tree.

## BLACK WALNUT

*Juglans nigra*

Although black walnut is a useful timber and nut tree, it is not desirable as a shade tree for several reasons. It is one of the last trees to leaf in the spring, and one of the first to shed foliage in fall. Walnut exudes a chemical called juglone from the roots that can retard the growth of adjacent plants. The nuts clutter lawns and the hulls can cause serious allergic reactions in some people. Walnut anthracnose often causes trees to be defoliated in August, ruining the late summer shade. Leaf spots also may add to the problem.

## WILLOW

*Salix spp.*

Willows are fast-growing but usually short-lived trees that grow naturally in wet areas. White willow, weeping willow, pussy willow and contorted willow are a few of the popular willows. The most damaging diseases are cankers, which cause twig, branch and trunk die-back. Willows' brittle wood breaks easily in ice or wind.



# SUMMARY OF TREE CHARACTERISTICS

Plant name	Hardiness Zone	Height in Feet	Spread in Feet	Flower Color	Fall Color	Soil Moisture	Light Needed	Yearly Growth Rate	Tree Type
Alder, European	3-7	40-60	20-30	Red-brown	Green	Wide range	Full sun to light shade	Fast	Large shade tree
Baldcypress	5b-10	50-70	20-30	Not showy	Coppery-bronze	Wide range	Full sun	Medium	Conifer
Basswood, American	3-8	50-75	25-40	Light yellow	Yellow	Moist	Full sun to light shade	Medium	Large shade tree
Beech, American	3-8	50-75	35-60	Not showy	Yellow-bronze	Moist	Full sun to light shade	Slow	Large shade tree
Beech, European	4-6	40-50	15-25	Brown	Yellow-bronze	Average	Full sun to light shade	Slow	Medium tree
Birch, river	4-9	40-60	30-50	Not showy	Yellow	Moist	Full sun	Medium to fast	Large shade tree
Black gum	3b-9	40-60	20-30	Greenish white	Orange to scarlet	Wide range	Full sun to light shade	Slow	Large shade tree
Buckeye, Ohio	3b-7	20-40	15-30	Greenish white	Yellow	Moist to average	Full sun to light shade	Slow	Small tree
Buckeye, red	6-9	10-20	10-20	Red	Yellow-green	Moist to average	Full sun to light shade	Slow	Small tree
Cherry, flowering	5-8	20-30	15-25	White to light pink	Yellow-bronze	Moist	Full sun to light shade	Medium	Small tree
Coffeetree, Kentucky	3-8	60-75	40-60	Greenish white	Yellow	Average	Full sun	Medium	Large shade tree
Corktree, Amur	4-7	25-45	25-40	Yellow-green	Yellow	Moist to average	Full sun	Medium	Medium tree
Crabapple, flowering	5-8	10-20	8-20	White, pink, red	Yellow	Average	Full sun	Medium	Small tree
Cucumbertree	4-8	50-60	40-60	Greenish white	Yellow-green	Moist	Full sun to light shade	Medium	Large shade tree
Dogwood, flowering	5b-8	15-25	10-30	White, pink, red	Red	Moist to average	Light shade	Slow	Small tree
Elm, American	5-7	50-70	50-70	Pale yellow	Yellow	Wide range	Full sun	Fast	Large shade tree
Elm, Chinese	5b-9a	40-50	40-50	Not showy	Yellow	Moist	Full sun	Medium	Medium tree
Filbert, Turkish	4-7	40-50	20-25	Not showy	Yellow to purple to red	Wide range	Full sun	Medium	Medium tree
Fir, Douglas	4-7a	40-60	10-20	Not showy	Green	Moist	Full sun to light shade	Slow to medium	Conifer
Fir, white	3-8a	40-50	15-30	Not showy	Green	Moist	Sun to light shade	Slow	Conifer
Ginkgo	3b-9	50-60	30-40	Not showy	Bright yellow	Average	Full sun to light shade	Slow to medium	Large shade tree
Hawthorn	4-8	20-30	15-30	White	Scarlet	Average	Full sun to light shade	Medium	Small tree

Plant name	Hardiness Zone	Height in Feet	Spread in Feet	Flower Color	Fall Color	Soil Moisture	Light Needed	Yearly Growth Rate	Tree Type
Hemlock, Canadian	3-8a	40-60	20-30	Not showy	Green	Moist	Full sun to light shade	Slow	Conifer
Holly, American	5b-9	30-50	15-30	Not showy	Green	Moist	Light shade	Slow	Conifer
Honeylocust, thornless	3-9	30-60	25-50	Not showy	Yellow	Wide range	Full sun	Fast	Large shade tree
Hophornbeam	3b-9	30-40	20-30	Red-brown	Yellow	Average	Full sun to light shade	Slow	Medium tree
Hornbeam, European	4b-7	40-60	20-40	Red	Yellow-green	Average	Full sun to light shade	Medium	Large shade tree
Horsechestnut	3b-7	40-60	25-50	White	Yellow	Moist	Full sun to light shade	Medium	Large shade tree
Juniper, Chinese	3b-9	20-60	15-25	Not showy	Green	Average	Full sun	Slow to medium	Conifer
Katsura	5-8	40-60	25-50	Not showy	Yellow	Moist	Full sun to light shade	Medium	Large shade tree
Lilac, Japanese tree	3-7	20-30	15-25	Creamy white	Yellow	Wide range	Full sun	Medium	Small tree
Linden, littleleaf	3b-7a	50-70	25-40	Yellow-green	Yellow-green	Moist	Full sun to light shade	Slow to medium	Large shade tree
Magnolia, Saucer	4b-8	20-30	15-30	Pink shades	Yellow-brown	Moist	Full sun to light shade	Slow	Small tree
Magnolia, sweetbay	5b-9	10-30	8-15	White	Green	Wide range	Full sun to light shade	Medium to fast	Small tree
Maple, Amur	3-8	15-20	15-25	Yellow-white	Yellow and red	Moist	Full sun to light shade	Fast	Small tree
Maple, red	3-9	40-70	30-50	Red	Red to yellow	Moist	Full sun to light shade	Medium to fast	Large shade tree
Maple, Tatarian	3-8	15-20	15-20	Green-white	Red and reddish-brown	Wide range	Full sun to light shade	Slow to medium	Small tree
Maple, Shantung	3-8	20-30	20-25	Green-yellow	Yellow to red	Wide range	Full sun to light shade	Slow	Small tree
Maple, sugar	4-8	60-80	40-60	Yellow-green	Yellow to red	Moist to average	Full sun to light shade	Slow to medium	Large shade tree
Oak, bur	3a-9a	70-80	70-80	Not showy	Yellow-brown	Wide range	Full sun	Slow	Large shade tree
Oaks, chestnut and swamp chestnut	4-8	50-70	40-70	Not showy	Yellow-brown	Moist to average	Full sun	Medium	Large shade tree
Oak, chinkapin	5b-7	40-60	50-60	Not showy	Yellow	Dry	Full sun	Medium	Large shade tree
Oak, English	4-8	40-60	10-40	Not showy	Brown	Average	Full sun	Medium	Large shade tree
Oak, Northern red	4-8	60-80	60-80	Not showy	Red	Average	Full sun	Medium to fast	Large shade tree
Oak, post	6a-9a	40-50	40-50	Not showy	Yellow-brown	Dry	Full sun	Slow	Medium tree
Oak, sawtooth	5b-9	30-40	30-40	Not showy	Yellow-brown	Wide range	Full sun	Medium	Medium tree



Plant name	Hardiness Zone	Height in Feet	Spread in Feet	Flower Color	Fall Color	Soil Moisture	Light Needed	Yearly Growth Rate	Tree Type
Oak, scarlet	4-8	60-80	30-50	Not showy	Russet to red	Average	Full sun	Medium	Large shade tree
Oak, Shumard	5b-9	50-75	40-75	Not showy	Red	Average	Full sun	Medium	Large shade tree
Oaks, Southern red and cherrybark	6b-9	50-70	40-70	Not showy	Brown	Moist	Full sun	Medium	Large shade tree
Oak, swamp white	3-8	50-80	40-70	Not showy	Yellow	Moist	Full sun	Medium	Large shade tree
Oak, water	6b-9	50-75	35-60	Not showy	Green	Wide range	Full sun to light shade	Medium to fast	Large shade tree
Oak, white	4b-9a	70-90	50-80	Not showy	Reddish-purple	Moist to dry	Full sun	Slow	Large shade tree
Oak, willow	5b-9	50-70	40-60	Not showy	Yellow-brown	Wide range	Full sun	Medium	Large shade tree
Pagodatree, Japanese	4b-8	30-50	30-50	Cream to light yellow	Green	Moist	Full sun	Medium	Medium tree
Parrotia, Persian	5-8	20-40	15-30	Not showy	Orange, red or yellow	Wide range	Full sun to light shade	Slow	Small tree
Pecan	5b-9	50-70	40-70	Not showy	Yellow	Moist	Full sun	Slow	Large shade tree
Pine, Eastern white	3-8	60-80	30-40	Not showy	Green	Average	Full sun	Fast	Conifer
Pine, Japanese black	5b-8	30-60	20-40	Not showy	Green	Wide range	Full sun	Medium	Conifer
Pine, Japanese red	5b-7b	40-60	40-60	Not showy	Green	Average	Full sun	Slow	Conifer
Pine, limber	4b-7	30-50	20-30	Not showy	Green	Average	Full sun	Medium	Conifer
Pine, red	2b-6	40-60	25-40	Not showy	Green	Wide range	Full sun	Medium	Conifer
Planetree, London	6a-9a	70-90	65-80	Not showy	Yellow-brown	Wide range	Full sun to light shade	Medium	Large shade tree
Plum, purple-leaf	5-8	15-25	10-25	Pale pink	Purple	Average	Full sun	Fast	Small tree
Redbud, Eastern	4-9	20-30	15-30	Pink, white	Yellow	Moist to average	Light shade	Medium	Small tree
Redcedar, Eastern	2-9	30-50	10-25	Not showy	Green	Average	Full sun	Medium	Conifer
Rubber tree, hardy	5b-7	30-50	20-30	Not showy	Green	Average	Full sun	Medium	Medium tree
Serviceberry, downy	4-9	15-30	10-20	White	Yellow to red	Moist	Full sun to light shade	Medium	Small tree
Silverbell	5-8	30-40	15-25	White	Yellow	Moist	Full sun to light shade	Medium	Medium tree
Sourwood	5b-9	50-60	15-20	White	Yellow to purple to red	Moist	Full sun to light shade	Slow	Large shade tree

Plant name	Hardiness Zone	Height in Feet	Spread in Feet	Flower Color	Fall Color	Soil Moisture	Light Needed	Yearly Growth Rate	Tree Type
Spruce, Colorado and blue	2b-7	30-60	15-25	Not showy	Green	Average	Full sun	Slow	Conifer
Spruce, Norway	2-7	50-70	30-45	Not showy	Green	Moist to average	Full sun to light shade	Medium	Conifer
Spruce, white	2-6	30-50	10-20	Not showy	Green	Moist	Full sun to light shade	Slow	Conifer
Sweetgum	5b-9	60-75	40-60	Not showy	Yellow to red	Moist	Full sun	Medium	Large shade tree
Sycamore, American	4-9	70-100	60-80	Not showy	Brown	Moist	Full sun	Fast	Large shade tree
Tuliptree	4b-9	70-100	35-50	Yellow-green	Yellow	Moist	Full sun	Fast	Large shade tree
Yellowwood	4-8	30-50	20-35	White	Yellow	Moist to average	Full sun	Medium	Medium tree
Zelkova, Japanese	5b-8	40-60	40-60	Not showy	Yellow-brown	Moist	Full sun	Medium	Large shade tree



# SPECIES INDEX

*The trees in italic are NOT recommended for planting in urban areas.*

Alder, European .....	31	Horsechestnut .....	36	Pagodatree, Japanese .....	27
<i>Ash, green</i> .....	48	Juniper, Chinese .....	12	Parrotia, Persian.....	27
<i>Ash, white</i> .....	48	Katsura.....	37	<i>Pawpaw</i> .....	49
Baldcypress .....	10	Lilac, Japanese tree.....	23	Pecan .....	45
Basswood, American.....	31	Linden, littleleaf.....	37	<i>Pear, Callery</i> .....	49
Beech, American .....	32	<i>Locust, black</i> .....	48	<i>Persimmon</i> .....	49
Beech, European .....	18	Magnolia, saucer .....	24	<i>Pine, Austrian</i> .....	49
<i>Birch, European white</i> .....	48	Magnolia, swamp.....	24	Pine, Eastern white .....	13
Birch, river .....	32	Magnolia, sweetbay .....	24	Pine, Japanese black.....	13
Black gum .....	33	Maple, Amur.....	25	Pine, Japanese red .....	14
<i>Boxelder</i> .....	48	Maple, low-growing .....	25	Pine, limber .....	14
Buckeye, Ohio .....	18	Maple, red.....	38	Pine, red .....	15
Buckeye, red.....	19	Maple, Shantung.....	25	<i>Pine, Scotch</i> .....	49
<i>Catalpa, Northern</i> .....	48	<i>Maple, silver</i> .....	49	Plantree, London.....	46
<i>Cherry, black</i> .....	48	Maple, sugar.....	38	Plum, purple-leaf .....	28
Cherry, flowering.....	19	Maple, Tartarian.....	25	<i>Poplar</i> .....	50
Coffeetree, Kentucky .....	33	<i>Mimosa</i> .....	49	Redbud, Eastern .....	28
Corktree, Amur .....	20	<i>Mountainash</i> .....	49	Redcedar, Eastern.....	15
<i>Cottonwood, Eastern</i> .....	50	<i>Mulberry, red</i> .....	49	Rubber tree, hardy.....	29
Crabapple, flowering.....	20	<i>Mulberry, white</i> .....	49	Serviceberry, downy.....	29
Cucumbertree.....	34	Oak, bur.....	39	Silverbell.....	30
Dogwood, flowering .....	21	Oak, cherrybark.....	42	Sorrel tree .....	45
Elm, American.....	34	Oak, chestnut.....	39	Sourwood .....	45
Elm, Chinese.....	21	Oak, chinkapin .....	40	Spruce, blue.....	16
Elm, lacebark .....	21	Oak, English.....	40	Spruce, Colorado.....	16
<i>Elm, Siberian</i> .....	48	Oak, Northern red.....	41	Spruce, Norway .....	16
Filbert, Turkish .....	22	<i>Oak, pin</i> .....	49	Spruce, white .....	17
Fir, Douglas.....	10	Oak, post.....	26	Sweetgum .....	46
Fir, concolor .....	11	Oak, sawtooth.....	26	Sycamore, American.....	46
Fir, white.....	11	Oak, scarlet.....	41	<i>Tree-of-Heaven</i> .....	50
Ginkgo .....	35	<i>Oak, shingle</i> .....	49	Tuliptree .....	47
<i>Hackberry, common</i> .....	48	Oak, Shumard .....	42	<i>Walnut, black</i> .....	50
Hawthorn, green.....	22	Oak, Southern red.....	42	<i>Willow</i> .....	50
Hawthorn, Washington .....	22	Oak, swamp chestnut .....	39	Yellowwood .....	30
Hemlock, Canadian.....	11	Oak, swamp white .....	43	Zelkova, Japanese .....	47
<i>Hickory</i> .....	48	Oak, water.....	43		
Holly, American .....	12	Oak, white.....	44		
Honeylocust, thornless .....	35	Oak, willow .....	44		
Hophornbeam .....	23	<i>Olive, Russian</i> .....	49		
Hornbeam, European.....	36	<i>Osage-orange</i> .....	49		

# GLOSSARY

**Balled and burlapped**—Plants that are dug with a ball of soil around the roots, which is then wrapped with burlap or other material.

**Bare rooted**—Plants that are dug and handled with little or no soil on their roots. The plants are stored so the roots are kept moist and the tops dormant. They should be planted before growth begins.

**Blight**—A disease that kills young growing tissues. Blights may affect leaves, twigs and smaller limbs.

**Cankers**—Fungus diseases that kill localized areas of tissue on branches and the trunk. Growth of healthy wood around a canker creates a sunken area at the site.

**Container grown**—Plants grown and marketed in containers. Common container sizes range from 1 to 5 gallons. Container grown plants may be planted year-round.

**Cultivar**—A cultivated variety of a particular species that has a distinctive feature such as flower color, fruit, form, leaf color or disease resistance. Cultivars carry names such as ‘Green Mountain’ maple. Cultivars should perform in very predictable ways.

**Flowers and Fruits**—Some trees have male and female flowers on the same tree, while others are separate sexed. If fruiting is an important consideration, learning whether a tree is male or female is necessary.

**Galls**—An abnormal swelling of plant tissues. Galls may be caused by insects, mites, nematodes, fungi or bacteria and can be found on leaves, twigs and roots.

**Hardiness zones**—Indicate the average annual minimum temperatures and are used to show the geographic limits of cold hardiness. The zones are broken into 10 degree intervals, with each zone split into an ‘a’ (north) and ‘b’ (south) subzones based upon 5 degree intervals. The USDA Hardiness Zone Map divides Missouri into six subzones, from ‘4b’ in northwest Missouri to ‘7a’ in the Bootheel.

**Leaf blotch**—Irregular areas of diseased tissue on a leaf.

**Leaf scorch**—Browning and shriveling of leaves due to very hot weather.

**Rust**—A fungus disease that infects both a host and an alternate host before completing its life cycle. A common example is cedar-apple rust.

**Site**—A specific tree planting location. Each site is influenced by a different combination of factors including soil physical qualities, aspect, moisture, soil fertility and others. Most trees will grow best on sites with deep loamy soil, plentiful moisture, full sunlight and room to develop.

**Suckers and watersprouts**—Vigorous, upright shoots that grow from buds in older wood. Suckers arise below the ground from the trunk or roots. Watersprouts are found on the trunk and older branches. Both should be removed as soon as possible.

**Sun scald**—Injury or death to the bark and cambium caused by a rapid drop in temperature. Sun scald is actually a freezing injury.

**Tolerance**—The ability of a tree to withstand some condition, such as shade, drought, soil compaction, high winds or flooding. A tree may tolerate less than ideal growing conditions but may not necessarily thrive there.

**Wilt**—A deficiency of water in the leaves. Wilting may be caused by low soil moisture or by parasites. The wilting caused by parasites is due to toxins they produce; later the water-conducting vessels may become plugged by bacterial or fungus growth, or by proliferation of neighboring cells.



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