HORTICULTURAL
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Selecting Landscape Plants: Shade Trees

Division of Plant Sciences

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Trees are the basic element for any landscape plan. They set the stage for the entire home grounds design. The type used and their location determine to a great extent what other plantings are appropriate.

Trees are the most permanent plants we grow. Many will live and enhance the landscape for 100 or more years if they are given a chance. Because of the permanency of trees and their importance in the landscape, care must be taken to select the best species for each situation. The wrong tree or one planted in the wrong spot can actually detract from the overall landscape. Five to 10 years of precious tree growing time may be lost before the mistake is realized.

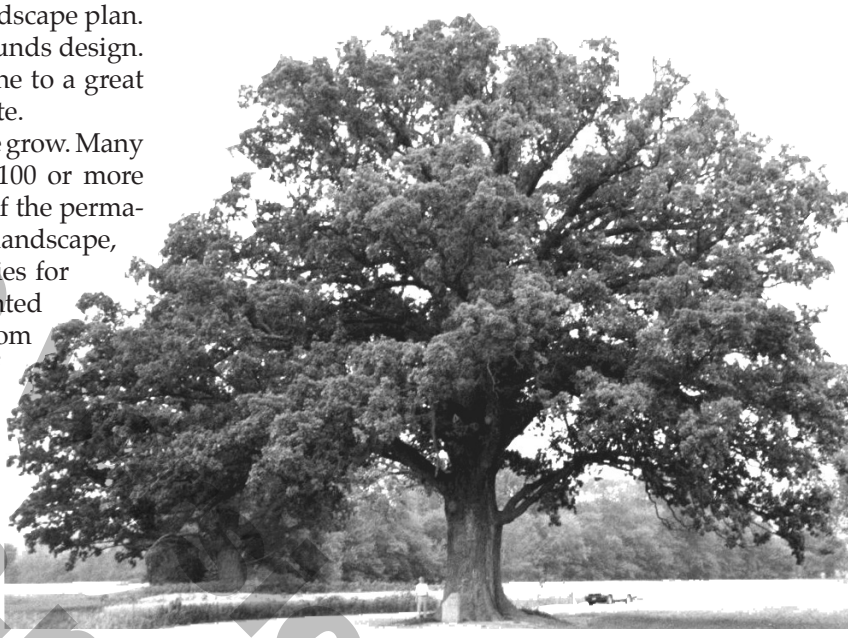

Figure 1. Like the bur oak, many of Missouri's native oak species develop into large, strong-branched shade trees.

How to choose trees

No species or variety of tree is sufficiently superior to be called ''best'' without some qualifications. However, there are many excellent varieties (see Figure 1). Choosing a variety with the characteristics that will provide the greatest satisfaction in a given situation requires careful consideration.

Most homeowners make the mistake of deciding what kind of tree they want and then trying to fit it into their landscape. A more positive approach is to decide where a tree is needed and what that tree should do in the landscape. After the desired type of tree has been determined, then it is much easier to select a species to fulfill these requirements.

Avoid trees that are susceptible to storm damage, ones that are hosts to destructive insect and disease pests and those that produce an over abundance of objectionable seed or fruit. The choice will generally depend on existing conditions at the planting site. These include room for top and root growth, soil type, subsurface drainage and kind of plants you want to grow under the tree. For more information on tree selection see MU publication G 6900, *Tree Placement on Home Grounds*.

A tree is a long-term investment Therefore, start with a high-quality plant. Trees 8 to 10 feet tall, either balled and burlapped or growing in containers, are usually the best buy. Species that are difficult to transplant may be more easily established if you start with smaller sizes. A reputable dealer will usually help select the tree and guarantee it to be alive and healthy.

If you don't have a green thumb, the nursery will probably plant the tree for a small additional cost. MU publication G 6955, *Improving Lawn and Landscape Soils*, contains information that may be helpful.

Tree species described in this publication are the ones most commonly available in retail nurseries and garden centers Some species have been included on the list because they are commonly available even though they are not recommended for general landscape planting. See Table 1 for a summary comparison of characteristics of several species. The table shows the maximum height to which each species can be expected to grow. It also rates the relative merits of each species for

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Table 1. Maximum height and relative rating for eight factors for selected shade trees.
□ very poor, ▲ poor, ▲▲ good, ▲▲▲ excellent

Species	Maximum height (feet)	Relative growth rate	Freedom from insect pests	Freedom from disease problems	Resistance to storm damage	Will grow on poorly drained soil	Will grow on hot dry areas	Easy to transplant	Withstands city conditions
Large trees									
Ash									
Green	60	▲▲▲	▲	▲▲	▲▲	▲▲	▲▲▲	▲▲	▲▲
White	80	▲▲	▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲
Bald cypress	100	▲▲	▲▲▲	▲▲▲	▲▲	▲▲▲	▲▲	□	▲▲
Honey locust	80	▲▲▲	□	▲▲	▲▲	▲▲	▲▲▲	▲▲	▲▲
Horse chestnut	60	▲	▲▲	▲▲	▲	▲	▲	▲	▲
Maple									
Norway	70	▲▲	▲▲	▲▲	▲▲	▲	▲	▲▲	▲▲
Red	90	▲▲▲	▲▲	▲▲	▲	▲▲▲	▲	▲▲	▲
Silver	90	▲▲▲	▲▲	▲▲	□	▲▲▲	▲	▲▲	▲
Sugar	90	▲▲	▲	▲	▲▲	▲	▲	▲▲	□
Oak									
Bur	80	▲	▲▲	▲▲▲	▲▲▲	▲	▲▲	▲	▲▲▲
English	60	▲▲	▲▲	▲▲▲	▲▲▲	▲	▲▲	▲▲	▲▲
Pin	70	▲▲	▲▲	▲▲	▲▲▲	▲▲	▲	▲▲	▲▲
Red, Scarlet	70	▲▲	▲▲	▲▲	▲▲▲	▲▲	▲▲	▲	▲▲
Swamp white	60	▲▲	▲▲	▲▲	▲▲▲	▲▲▲	▲▲	▲▲	▲▲▲
White	80	▲	▲▲	▲▲▲	▲▲▲	▲	▲▲▲	□	▲▲
Siberian elm	70	▲▲▲	□	▲	□	▲▲	▲▲▲	▲▲▲	▲▲
Sweet gum	80	▲▲	▲▲	▲	▲▲	▲▲▲	▲	▲	▲▲
Sycamore	100	▲▲▲	▲▲	▲	▲▲	▲▲▲	▲▲	▲▲	▲▲
Tulip tree	100	▲▲	▲▲	▲▲	▲	▲	□	▲	▲▲
Medium-sized trees									
Black gum	30	▲	▲▲▲	▲▲▲	▲▲	▲▲	▲	□	▲
Ginkgo	60	▲	▲▲▲	▲▲▲	▲▲▲	▲	▲▲	▲▲	▲▲▲
Japanese pagoda tree	40	▲▲	▲▲▲	▲▲	▲▲	▲	▲▲	▲▲	▲▲▲
Linden	30–60	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲	▲▲▲
River birch	60	▲▲	▲▲	▲▲▲	▲▲	▲▲▲	▲	▲▲	▲▲
Yellowwood	40	▲	▲▲▲	▲▲▲	▲▲	▲	▲▲	▲	▲▲
Small trees									
Amur maple	20	▲	▲▲	▲▲	▲▲	▲▲	▲▲▲	▲▲▲	▲▲▲
Golden-rain tree	20	▲	▲▲▲	▲▲	▲	▲	▲▲	▲▲▲	▲▲
Trident maple	30	▲▲	▲▲	▲▲	▲▲	▲	▲▲▲	▲▲▲	▲▲

eight different factors that should be considered when making a selection.

Your local nursery will probably not have all of the species included in this list in stock. However, you can usually order a specimen if you allow enough time.

Improved varieties are available for most of the species in this list. In most cases, these varieties need to be asexually propagated from the original selected parent. Most of the selected varieties are superior to the standard varieties grown from seed and well worth the added cost needed to produce them.

The trees listed in the following section have been divided into three groups according their size. The large trees reach a mature height of greater than 60 feet. Trees with a mature height between 30 and 60 feet make up the medium-sized group. Relatively few shade trees are less than 30 feet tall. The need for small trees may often be satisfied by flowering trees For more information on flowering trees, see MU publication G 6805, *Selecting Landscape Plants: Flowering Trees.*

Large trees

Green ash ***(Fraxinus pennsylvanica)***

Green ash is a vigorous tree while young. It develops a broad crown at maturity. The leaves turn a bright yellow in fall but do not remain on the tree long enough to be effective. It is drought resistant and will grow on a wide variety of soil types. A borer insect can be a serious pest of green ash while it is becoming established. Seedlings of green ash can be a problem in flower beds and untended areas. Therefore, it is advisable to plant a seedless variety such as 'Marshall's Seedless' instead of the standard ones.

White ash ***(Fraxinus americana)***

White ash does not grow as fast as green ash, but it will eventually become a larger tree (see Figure 2). It develops a purple fall color that is rather unique. Seedless varieties of white ash such as 'Rosehill' or 'Autumn Purple' should be planted in preference to the standard varieties. Emerald ash borer, an exotic pest from Asia may eventually limit the usefulness of green and white ash in Missouri.

Figure 2. White ash is a fairly rapid grower that forms an oval-shaped tree and develops distinctive purplish fall color.

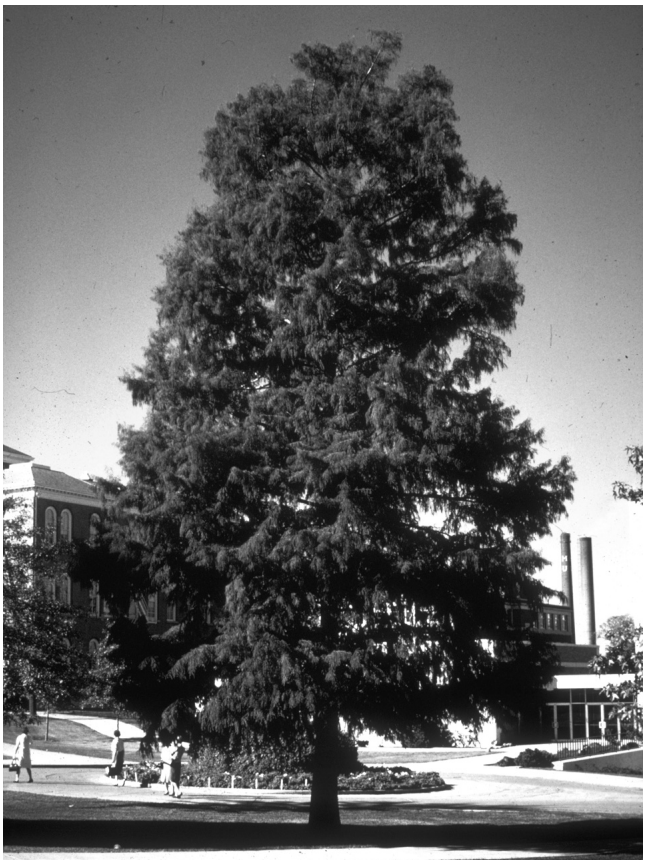

Figure 3. Although bald cypress is often associated with swampy conditions, it is also an excellent shade tree for drier sites.

Bald cypress ***(Taxodium distichum)***

This fast-growing, pyramid-shaped tree becomes rounded with age (see Figure 3). The light green, fern-like leaves turn a rust color before they are shed in the fall. This tree has relatively few insect or disease problems and will grow on a wide variety of soil types. Bald cypress is difficult to move and should be transplanted while young.

Honey locust ***(Gleditsia triacanthos* var. *inermis)***

Native honey locust trees are best known for their long, stiff, branched thorns that are a constant hazard. They also produce long, flat seed pods that may be a nuisance. The improved thornless, podless varieties of honey locust are the only ones that should be considered for planting. Many of these varieties are available. They make exceptional shade trees. The lacy foliage gives a loose, open shade that is ideal for shading patios and for growing plants. In the autumn the small leaflets filter into the grass as they fall and require little raking. Unfortunately, honey locust is subject to attacks by mimosa webworms, and unless the insect is controlled it may nearly defoliate the tree by midsummer some years.

Horse chestnut ***(Aesculus hippocastanum)***

The horse chestnut is a magnificent tree in the spring when its foot-long panicles of showy flowers cover the tree like candles on a Christmas tree. It is definitely not a tree for the small yard. Its course texture and large size make it look out of place except in a very large area. The horse chestnut has earned a bad reputation in many areas. Its branches are relatively weak and subject to storm damage. The large nuts are produced profusely. They have no economic or ornamental value and are a nuisance wherever they fall.

The Baumann horse chestnut, a double-flowered variety, should be planted in preference to the standard varieties because it does not produce seed. There is also a red-flowered form available that is more showy than the standard white-flowered types.

Norway maple ***(Acer platanoides)***

As its name implies, the Norway maple is a native of Europe, but it has been widely planted over the eastern United States. Most of the varieties of maple with unusual shape or foliage color have been derived from this species. They include such popular varieties as: 'Schwedler,' which has purple leaves in early spring that change to dark green color; 'Crimson King,' with purple leaves that retain their color all summer; 'Columnare,' only one of several varieties with a narrow columnar habit of growth; 'Globosum,' a low-growing, round-headed tree that can be grown under utility wires; and 'Summershade,' a rapid-growing, heat-resistant variety with an upright growing habit. Many other varieties of Norway maple have been selected and named. Because a name does not appear in Table 1 does not mean that it is not as good as the

ones listed. Ask nursery personnel for advice on the varieties not listed.

The dense shade and shallow root system make it almost impossible to grow anything under a Norway maple. Its yellow flowers in early spring are interesting but not especially ornamental. It certainly has merit for planting in areas where you don't care if you can grow anything in its shade or not.

Red maple ***(Acer rubrum)***

The flowers of the red maple are one of the first signs of spring. The profusion of tiny red flowers with the background of smooth gray bark is a beautiful sight. Red maple is also one of the first trees to change color in the fall. Some trees develop a good red fall color, but many of them do not. Several improved varieties of red maple produce outstanding fall color. There are also varieties available with a narrow crown.

Red maple is easy to transplant and grows rapidly. However it is relatively weak wooded and subject to storm damage.

Silver maple ***(Acer saccharinum)***

Silver maple is a fast-growing but relatively short-lived tree. Its brittle wood is too subject to storm damage for it to be recommended for general landscape use. The tree is also notorious for plugging sewer lines and lifting sidewalks. The tree should only be used in areas where its branches will not be a hazard if they fall and where it will not interfere with sewers or sidewalks.

Sugar maple ***(Acer saccharum)***

The fire red to yellow fall color of the sugar maple is one of the most beautiful sights in Missouri. The sap of this tree can he boiled down to produce maple syrup and sugar. Mature sugar maples show a wide variation in form but tend to have a broad, rounded head. At least one disease and two insects attack sugar maple; this limits its usefulness in areas of the state where these pests are a problem. Susceptibility to gas and smoke damage makes sugar maple unsuitable for city conditions. It does not tolerate poor soil drainage.

Bur oak ***(Quercus macrocarpa)***

Although too large for most home landscapes, bur oak makes a majestic tree in a park setting (Figure 1). It is considered somewhat difficult to transplant but, once established, it tolerates urban conditions better than most oaks. Its large, fringed acorns are a novelty but may be a nuisance.

English oak ***(Quercus robur)***

This is a fast-growing, clean tree with few insect and disease problems. The only varieties of English oak generally available in nurseries are the columnar types with a very narrow crown. English oak is one of the best of the columnar trees.

Pin oak ***(Quercus palustris)***

The branching habit of the pin oak is unique (see Figure 4). The upper branches are ascending, the middle ones horizontal and the lower ones drooping. This branching habit makes pin oak a poor choice as a shade or street tree. As lower branches are removed to allow for traffic beneath the tree, the horizontal branches begin to droop. Some branches always seem to be hanging down to interfere with traffic. Pin oak should he planted where it has room to assume its natural shape and the branches can be allowed to grow down to the ground. Pin oak will not grow in soil with a high pH. The leaves will turn yellow because of iron chlorosis, and extensive soil treatment will be needed to return the tree to a healthy condition.

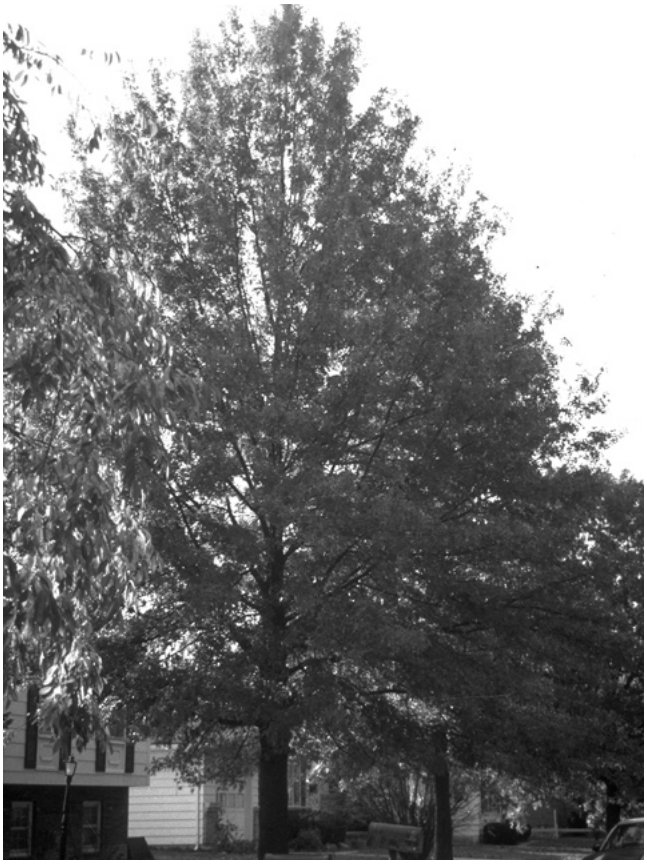

Figure 4. Pin oak continues to be among the most popular shade trees for home landscapes.

Red oak ***(Quercus borealis)***

Red oak is one of the fastest growing of all the oaks. It develops into a large, broad, round-topped tree with a deep red fall color. It withstands city conditions, has a clean habit of growth and makes one of our best street and shade trees.

Scarlet oak ***(Quercus coccinea)***

Scarlet oak is very similar to red oak. Few people can tell the two species apart. As far as the landscape is concerned, they can be considered as the same.

Swamp white oak **(Quercus bicolor)**

Swamp white oak has a broad, ovate form when mature but looks coarse when young. It transplants more easily than white oak and grows moderately fast. It tolerates drought, salt and compaction better than most oak species. Leaves are whitish on the underside, adding interest to the summer foliage.

White oak ***(Quercus alba)***

A mature white oak is one of the most majestic of trees. They are rounded in outline with thick sturdy horizontal branches. The white oak is slower growing and more difficult to transplant than the other oaks. However, it is not as susceptible to insects and diseases, and it grows on a wider range of soil types. It is a difficult species to transplant and should only be moved in the spring.

Siberian elm ***(Ulmus pumila)***

The Siberian elm is better known in this country as the Chinese elm than it is by its correct common name. The true Chinese elm, a small tree native to central and southern China, is not commonly grown in the central United States.

About the only desirable characteristic of the Siberian elm is its ability to grow in areas where few other trees will survive. It is short-lived, has some serious insect problems and is highly susceptible to storm damage. The Siberian elm should never be seriously considered for planting except in areas where few other trees will grow.

Sweet gum ***(Liquidambar styraciflua)***

The glossy green star-shaped leaves of the sweet gum are its most ornamental characteristic. Where it is given room to develop, few trees will approach it in symmetrical beauty. The ball-shaped fruit hang on the tree long after the leaves have fallen, giving added interest to the tree, but they are a nuisance in the lawn once they have fallen. A disease called bleeding canker has attacked sweet gums in some parts of the state. There is no known cure for the disease, and it may be wise to choose some other species for planting in areas where the sweet gum has already been extensively planted.

American sycamore or plane tree ***(Platanus occidentalis)***

The most striking feature of the sycamore is its flaking bark that peels off to reveal the lighter-colored underbark. It is considered a dirty tree, as it is continuously dropping bark and twigs that need to be picked up. A twig blight that temporarily disfigures the foliage attacks sycamore almost every spring. It will seldom kill the tree, but it certainly reduces its value as an ornamental. Sycamore is a fast-growing tree that will reach an immense size. It is much too large for the average home grounds. It needs a deep, rich soil to develop properly.

If a sycamore is desired, the European species, London plane tree, or the Asiatic species, Oriental plane tree, is a much better choice than the native American species. They are resistant to the twig blight and do not reach as large a size.

Tulip tree ***(Liriodendron tulipifera)***

Tulip tree needs a deep, fertile soil to develop properly. It is often difficult to establish, but once established it will grow rapidly and develop into a large tree. It is much too large for the average-sized yard and should be planted only where it has ample growing space.

The light green tulip-shaped flowers are produced in May. After the fruit breaks open in the fall to release its seek, a tulip-shaped portion of the fruit remains on the tree to add interest during the winter. Tulip tree has few serious insect of disease problems. However, the leaves may turn yellow and drop during hot, dry periods of midsummer.

Medium-sized trees

Black gum ***(Nyssa sylvatica)***

The scarlet to orange fall color of the black gum is one of the most brilliant fall colors of any tree species. It is a densely pyramidal tree with lustrous, dark green leathery leaves. It is a difficult tree to transplant, and like most hard-to-transplant trees, the smaller sizes have a better chance of surviving after they are moved. Black gum is sometimes difficult to find in many nurseries, but it should become more commonly available as more people get to know its merits. It is a slow-growing but pest-free tree.

Ginkgo ***(Ginkgo biloba)***

Geological evidence indicates that the ginkgo has been growing on earth for the past 150 million years. Although it is one of the most primitive trees known, it is one of the best adapted to city conditions. The ginkgo has no known insect or disease pests and hence never needs spraying. The interesting fan-shaped leaves of the ginkgo turn a clear yellow in autumn. Only grafted fnonfruiting varieties should be planted, as the round plumlike fruits of the tree have an obnoxious odor. Ginkgo will eventually grow to a large tree but it is slow growing and will take at least 50 years to develop to larger than a medium-sized tree.

Japanese pagoda tree ***(Sophora japonica)***

This tree gets its common name from the fact that it was commonly planted around Buddhist temples in the Asia. It is also known as the scholar tree or simply as Sophora. Its large clusters of pealike flowers are not especially showy, but they are interesting because they

Figure 5. River birch is a rapid-growing tree that produces unusual peeling bark.

appear in late summer after other trees have already flowered. The yellow seed pods usually hang on the tree until after it has lost its leaves in the fall.

Linden ***(Tilia* spp.)**

The lindens as a group are some of our best shade trees. Their small flowers produced in early summer are not especially ornamental, but they are highly fragrant. The small, round seed is borne on an interesting leafy bract that hangs on the tree well into the winter. Of the seven species of linden grown in this country, the little-leaved linden *(Tilia cordata)* is the most commonly available. The leaves of this species remain green on the tree long after other trees have shed theirs. Lindens have few insect or disease pests.

Improved varieties of linden include 'Green-spire,' a straight-trunked tree that rapidly grows into a narrow oval form; 'Chancellor,' with a narrow, compact, upright growth habit; and 'Redmond,' a densely pyramidal tree.

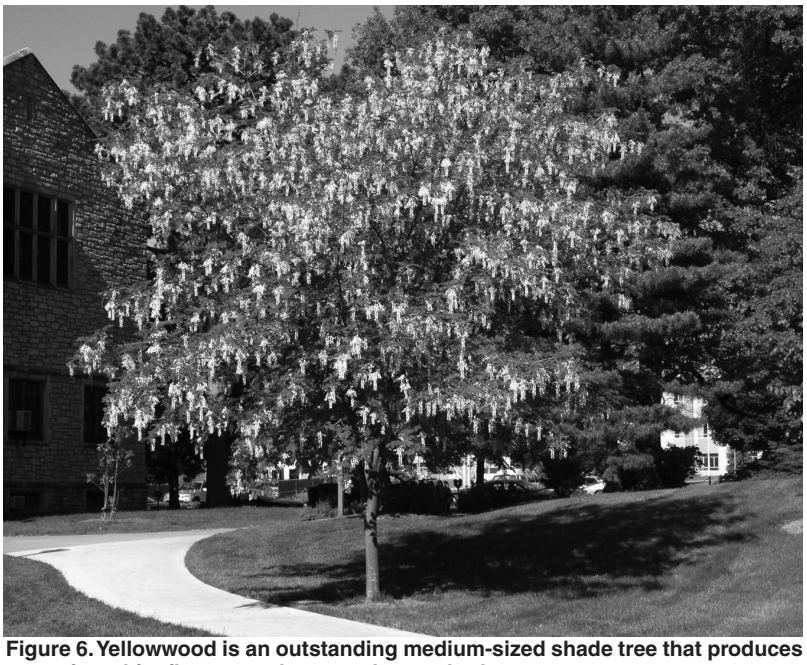

Figure 6. Yellowwood is an outstanding medium-sized shade tree that produces attractive white flowers and a smooth, gray bark.

River birch ***(Betula nigra)***

The most interesting characteristic of the river birch is its salmon-colored bark that peels off in paper-thin layers (see Figure 5). The tree is noted for its ability to grow in wet soils, but it will grow in drier situations. The river birch has been greatly ignored in favor of the more showy white-barked birches, but it is a fine ornamental and should be planted more. It is not as susceptible to stem-boring insects as the white-barked birches.

Yellowwood ***(Cladrastis kentukea)***

The most distinctive feature of the yellowwood is its pendulous clusters of white, fragrant, wisteria-like flowers (see Figure 6). The tree may not bloom every year, but the clean foliage and rounded form of this tree would make it worthwhile to plant if it never bloomed. The yellowwood has no serious disease or insect problems.

Small trees

Amur maple ***(Acer ginnala)***

The Amur maple is a small, round-headed, extremely hardy tree. Its red fall color is as brilliant as any of the maples. The winged seeds often hang onto the tree after the leaves have fallen, adding interest to the tree in winter. It is one of the best of the small trees, requiring practically no attention and able to grow in a wide range of soil types.

Golden-rain tree ***(Koelreuteria paniculata)***

The large, conspicuous yellow flower clusters of the golden-rain tree are produced in late June when few other trees are in bloom (see Figure 7). The flowers are followed by showy bladderlike fruit that hang like clusters of small chinese lanterns until late in the fall. Its wide-spreading branching is especially well suited for the small yard. It will grow in a wide variety of soils and has no serious insect or disease pests. However, it is a relatively short-lived tree.

Figure 7. The seed structures of golden-rain tree remain attractive through late summer, fall and winter.

Trident maple **Acer buergeranum)**

Trident maple is a small, round-headed tree with attractive, exfoliating bark. New leaves are often bronze to purple, changing to glossy green in summer and finally orange and red in the fall. It transplants readily and tolerates drought well.

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