

## **List of Alternative Trees to Replace Ash**

**Trees were selected on the basis of their resemblance to ash trees in such matters as shape and size, fall color, growth rate, and hardiness.**

**Thanks to Dave Roberts (Michigan State University), members of the Michigan Nursery and Landscape Association, Drs. Matt Jenks, Bruno Moser, Harvey Holt, and Mike Dana of Purdue University, USDA Forest Service, and the Southern Group of State Foresters for information on tree cultivars.**

### **MAPLES (*Acer* spp.)**

Maples (*Acer* species) are often grown for the shade they produce and their exceptional autumn color. They vary from narrow and columnar to wide spreading and round-headed to low and mounded. Maples vary in size from a small Japanese maple (8 feet) to a large sugar maple (100 feet).

Most maples have outstanding fall leaf colors, which range from muted yellow to bright orange and red. Some obtain large size and are used as shade trees, while others are small and used as accents in landscapes. Some species have showy red flowers that appear in late winter before the leaves emerge in the spring. Others are characterized by interesting bark features. The winged samara (the fruit,

The ideal soil for most maples is rich, porous and well-drained. Although they tolerate most soil pH levels, they tend to prefer slightly acid soil. Red and silver maples thrive in fairly wet soils. Some maples tolerate moderate drought. Most thrive in full sun or partial shade. Some are vulnerable to leaf scorch from excessive sunlight exposure.


Maples have been known to be attacked by borers, aphids, scales, leaf spots, tar spot, anthracnose, bacterial leaf scorch, canker and collar rot. Red and silver maples are soft-wooded and may break during ice storms. Slow-growing maples have hard wood and require less maintenance. The bark is thin on most maples, making them at risk for mechanical damage (which makes the tree more susceptible to disease and insects. Feeding roots on many maples are shallow, preventing good growth of turf beneath the canopy.

Maples "bleed," and while pruning them in spring when the sap is flowing does not harm them, the sap is messy and pruning at that time is typically avoided. Spring pruning has a greater impact on growth, as leaf area is reduced and less photosynthesis will occur during the growing season. Pruning in late summer and early fall minimizes the impact on growth, as leaves remain on the tree during the entire growing season. To reduce susceptibility to disease and insects, and ensure minimum impact on the growth of the tree, prune twigs and branches early in the growth of the tree.

<b>MAPLES</b>						
<b>RED MAPLE (<i>Acer rubrum</i> and <i>Acer freemanii</i>)</b>						
The Red Maple distinguishes itself by always having red present: red buds in winter, reddish flowers in spring, red leaf stalks in summer and a brilliant orange red to red fall color. Healthy growth and a dense oval to rounded habit make it an excellent shade tree. They are probably best suited for the moist, hospitable conditions of a lawn, as they are intolerant of polluted, urban conditions						
	<b>Common name</b>	<b>Zones</b>	<b>Height</b>	<b>Spread</b>	<b>Ornamental traits</b>	<b>Planting considerations and comments</b>
<i>Acer x freemanii</i> 'Autumn Blaze®'	Freeman Maple (Autumn Blaze)	3-7	40-50'	40'	<ul style="list-style-type: none"> <li>• Brilliant orange-red fall color.</li> <li>• Compact.</li> <li>• Oval.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Grows well in alkaline soils.</li> <li>• Grows up to 3 ft/year.</li> <li>• Tolerates intermittent wet sites as well as intermittent drought.</li> <li>• Has been remarkably free of sunscald injury...</li> </ul> <p><b><u>Potential problems:</u></b></p> <ul style="list-style-type: none"> <li>• Shallow root system leads to surface roots.</li> <li>• Thin bark can be easily damaged.</li> <li>• Leaf hoppers possible.</li> <li>• Requires careful pruning to eliminate branch-trunk</li> </ul>

						junctures with included bark. •
<i>Acer x freemanii</i> 'Celebration®'	Freeman Maple (Celebration)	4-7	35-45'	30-40'	<ul style="list-style-type: none"> <li>• Attractive red and gold autumn foliage.</li> <li>• Contoured, upright, uniform branching structure with a good central leader.</li> <li>• Strong crotch angles and limbs withstand wind and snow damage.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Seedless.</li> <li>• Disease resistant.</li> <li>• Tolerant of urban pollution.</li> <li>• Does not require trimming or pruning to maintain form</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Tolerant of most soils, but should generally avoid too-wet sites or high soil pH levels.</li> <li>• Long-lived; could outgrow small landscape area.</li> </ul>
<i>Acer x freemanii</i> 'Marmo®'	Freeman Maple (Marmo)	3-7	60-70'	35-45'	<ul style="list-style-type: none"> <li>• Upright, oval tree with a strong central leader.</li> <li>• Autumn foliage scarlet-maroon blend with tints of green. Unusual coloration in fall.</li> <li>• Reported to have</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Seedless.</li> <li>• Good growth rate; (more vigorous than Autumn Blaze®.)</li> <li>• Tolerance for most urban conditions.</li> </ul>

					better branch structure and strength than silver maple	
<i>Acer rubrum</i> 'Autumn Flame®'	Autumn Flame Red Maple	3-7	40-50'	40'	<ul style="list-style-type: none"> <li>• Dependable early red fall color.</li> <li>• Round shape.</li> <li>• Strong wood.</li> <li>• Crown is denser and more uniform than the others in the .species</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Fast grower.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Scorch may occur during periods of high temperatures accompanied by wind.</li> <li>• Tar spot and a variety of leaf spots cause some concern among homeowners.</li> </ul>
<i>Acer rubrum</i> 'Autumn Radiance®'	Autumn Radiance Red Maple	4-7	30-60'	40'	<ul style="list-style-type: none"> <li>• Consistent orange/red fall color.</li> <li>• Fall color appears two weeks earlier than others.</li> <li>• Broadly oval.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Very tolerant of soils. Prefers slightly acidic, moist conditions;.</li> <li>• Occurs naturally in low, wet areas</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Dense shade.</li> </ul>
<p><b>NORWAY MAPLE (<i>Acer platanoides</i>)</b></p> <p>Tolerant of most conditions, there are many varieties that differ in habit and foliage color. Generally, the Norway Maple has a round, symmetrical crown, medium growth rate and low maintenance requirements. With the exception of Crimson King Norway Maple, they have dark green, glossy foliage that turns a rich yellow in fall. Height 40-50', Spread 30-40</p>						

<i>Acer platanoides</i> 'Superform'	Superform Norway Maple	3-7	50-55'	40-50'	<ul style="list-style-type: none"> <li>• Yellow fall color.</li> <li>• Rounded crown is very uniform and fills with greenish-yellow flowers in the spring.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Resistant to frost (stem) cracking.</li> <li>• Site tolerant.</li> <li>• Very fast growing.</li> <li>• Easily transplanted,</li> <li>• Adapted to a wide variety of soils including alkaline.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Tree's dense shade and shallow root system competes with lawn grasses.</li> <li>• Shallow roots can make mowing under tree difficult.</li> <li>• Shallow roots can heave sidewalks.</li> <li>• Invasive.</li> </ul>
<p><b>SUGAR MAPLE <i>Acer saccharum</i> ' </b></p> <p>One of the most common of the large shade trees; oval to round in form. Most varieties of sugar maple are medium to fast growers, making them useful for streets, lawns and parks. Height 40-60', Spread 25-40' </p>						
<i>Acer saccharum</i> spp.	Sugar maple	3-8a	60-80'	35-50'		<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Grows up to 1 foot per year.</li> <li>• Native.</li> <li>• Does very well in reasonably good site.</li> <li>• Available.</li> <li>• Branches are strong, rarely break in wind or under ice load.</li> </ul>

						<p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Sensitive to reflected heat.</li> <li>• Intolerant of drought (leaf scorch).</li> <li>• Creates dense shade which reduces turf vigor.</li> <li>• Intolerant of urban conditions of compacted soil, heat, drought, de-icing salt.</li> </ul>
<b>SYCAMORE MAPLE (<i>Acer pseudoplanis</i>)</b>						
<i>Acer pseudoplanis</i>	Sycamore maple	5-7	40-80'	40-60'	<ul style="list-style-type: none"> <li>• Symmetrical canopy with smooth outline.</li> <li>• Individuals with more or less identical crown forms.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Fast growing.</li> <li>• Can be used on exposed sites or where salt or salt spray is a problem.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Non-native.</li> <li>• Fall foliage muted, pale.</li> <li>• Susceptible to trunk and branch cankers.</li> </ul>

### HACKBERRY (*Celtis* spp.)

Hackberry is usually a medium-sized tree, 30-50 feet high. Its limbs are often crooked and angular. The crown is made of slender branches or short, bristly, stubby twigs. It makes an excellent shade tree because of its urban-tolerance.

Hackberry may recover from transplanting from a field nursery slowly due to the extensive, coarsely branched root system but this can be overcome by planting from containers.

Hackberries bear a round, oblong fruit that may become a nuisance. The berries remain on the tree most of the winter if not consumed by wildlife.

Hackberry are well-suited for large parking lot islands; wide tree lawns; buffer strips around parking lots or for median strip plantings in highways; as a reclamation plant; as a shade tree; and as a residential street tree.

	<b>Common name</b>	<b>Zones</b>	<b>Height</b>	<b>Spread</b>	<b>Ornamental traits</b>	<b>Planting considerations and comments</b>
<i>Celtis occidentalis</i> <b>'Prairie Pride'</b>	<b>'Prairie Pride'</b> <b>Common Hackberry</b>	3-9	40-50'	40-50'	<ul style="list-style-type: none"> <li>• Irregular outline or silhouette.</li> <li>• Round, vase-shaped crown.</li> <li>• Fall color is normally poor but may be a good yellow.</li> </ul>	<p style="text-align: center;"><u><b>Attributes</b></u></p> <ul style="list-style-type: none"> <li>• Successfully grown in urban areas with air pollution, poor drainage, compacted soil, and/or drought.</li> <li>• This cultivar fruits far less than the species.</li> <li>• Native</li> <li>• Fast growth rate.</li> <li>• Available.</li> <li>• Tolerates dry, alkaline soils and windy conditions;</li> </ul> <p style="text-align: center;"><u><b>Potential problems</b></u></p> <ul style="list-style-type: none"> <li>• Hackberry nipple galls.</li> </ul>

						<ul style="list-style-type: none"> <li>• Epicormic shoots.</li> <li>• Messy fruits.</li> </ul> <p><i>(This cultivar has less potential for these problems than the species.)</i></p>
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### KATSURA TREE (*Cercidiphyllum* spp.)

Comments: Katsura trees are pest free and attractive. The fall color is yellow with some red and the new growth is reddish. The tree has a shallow root system and may be hard to transplant. Katsura trees have a spreading habit and makes a good shade tree.

	Common name	Zones	Height	Spread	Ornamental traits	Planting considerations and comments
<i>Cercidiphyllum japonicum</i>	Katsura Tree	4-8	40-50'	30'	<ul style="list-style-type: none"> <li>• Heart shaped blue-green leaves.</li> <li>• Apricot fall color with cinnamon-brown sugar scent.</li> <li>• Symmetrical canopy.</li> <li>• Tree shape is very consistent.</li> </ul>	<p><u>Attributes</u></p> <ul style="list-style-type: none"> <li>• Great fall color (apricot).</li> <li>• Moderate growth rate.</li> <li>• Drought tolerant once established.</li> <li>• Available.</li> </ul> <p><u>Potential problems</u></p> <ul style="list-style-type: none"> <li>• Sensitive when transplanting</li> <li>• Tends to be multi-stemmed.</li> <li>• Non-native.</li> <li>• Prefers rich, moist, slightly acidic soils.</li> <li>• May take several years to fully establish</li> </ul>

						<p>in the landscape.</p> <ul style="list-style-type: none"> <li>• Not suited for compacted soil; shallow roots disrupt sidewalk maintenance.</li> </ul>
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### GINKGO TREES (*Ginkgo biloba* spp.)

Ginkgo trees are almost pest-free, resistant to wind, and allow light to come in with moderate shade. They are, however, not native to North America. As trees grow, they fill in to form a dense canopy so they should only be planted in situations where there is plenty of unrestricted overhead space. Ginkgo trees tolerate most soils, including compacted and alkaline. They grow slowly to 75 feet or more tall. The tree is easily transplanted and has a vivid yellow fall color which is second to none in brilliance, even in the south. However, leaves fall quickly and the fall color show is short.

Only male plants should be used as the female produces ill-smelling fruit in late autumn.

	Common name	Zones	Height	Spread	Ornamental traits	Planting considerations and comments
<i>Ginkgo biloba</i> 'Autumn Gold'	'Autumn Gold' Maidenhair Tree	3-8	40-60'	30-40'	<ul style="list-style-type: none"> <li>• Brilliant gold fall color.</li> <li>• Symmetrical, broadly conical tree with a ten year height of twelve to fifteen feet.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Male (no fruits)</li> <li>• Disease and pest resistant.</li> <li>• Full sun.</li> <li>• Very pH adaptable</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Initial growth may be slow.</li> <li>• Does not tolerate salt well.</li> <li>• Needs adequate drainage to thrive.</li> </ul>
<i>Ginkgo biloba</i>	'Magyar'	4-8	50-60'	25-30'	<ul style="list-style-type: none"> <li>• Narrow compared to</li> </ul>	<b><u>Attributes</u></b>

'Magyar'	Maidenhair Tree				<ul style="list-style-type: none"> <li>other cultivars.</li> <li>• Gold fall color.</li> </ul>	<ul style="list-style-type: none"> <li>• Male (no fruits)</li> <li>• Disease and pest resistant.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Initial growth may be slow.</li> <li>• Does not tolerate salt well.</li> </ul> <p>Needs adequate drainage to thrive.</p>
<i>Ginkgo biloba</i> 'Princeton Sentry®'	Princeton Sentry Maidenhair Tree	4-8	60-70'	20-30'	<ul style="list-style-type: none"> <li>• Narrow compared to other cultivars.</li> <li>• Gold fall color.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Male (no fruits)</li> <li>• Disease and pest resistant.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Initial growth may be slow.</li> <li>• Does not tolerate salt well.</li> </ul> <p>Needs adequate drainage to thrive.</p>

### **HONEYLOCUST (*Gleditsia* spp.)**

Honeylocust is fast growing as a young tree and can grow 2 feet or more a year over a 10 year period.

This species has strong thorns that are straight, brown, sharp, and shiny. Unbranched spines are found on the 1-year-old twigs and remain for many years. The main stem has thorns that are often branched and as long as 15 inches. The thorns along the main stem are spectacular and borne in clusters that sometimes obscure the bark. The thorns are sufficient to identify native honeylocust.

Seed pods are eaten by many animals and, since the seeds are hard to digest, many seeds pass through animals' digestive systems and are widely scattered from the parent tree.

Thornless selections of common honeylocust are commonly planted as ornamentals. This tree makes a beautiful lawn tree and is well adapted for street and ornamental planting. Numerous named cultivars are available for landscape planting and avoid the obvious

problems that the thorns represent.

Unfortunately, these trees have been overplanted in some areas and insect problems are beginning to catch up with honeylocusts, including some of the cultivars.

It is recommended that honeylocust be planted in moderation to avoid catastrophe if insects or diseases invade. In Indiana, many honeylocusts are vulnerable to bagworm, spider mites, mimosa webworm, pod gall midge, and cankers..

	<b>Common name</b>	<b>Zones</b>	<b>Height</b>	<b>Spread</b>	<b>Ornamental traits</b>	<b>Planting considerations and comments</b>
<i>Gleditsia tria. inermis</i> 'Imperial®'	<b>Imperial Thornless Honeylocust</b>	4-7	40-50'	20-30'	<ul style="list-style-type: none"> <li>This cultivar of is smaller than others, growing only to 35 feet.</li> <li>Flat-topped, vase-shaped canopy.</li> <li>Yellow or golden fall color.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>Thornless.</li> <li>Usually fruitless.</li> <li>Very little fall raking required.</li> <li>Available.</li> <li>Native.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>Branches emerge fairly low on the trunk and some training is needed.</li> <li>Surface roots can lift sidewalks or interfere with mowing.</li> <li>Casts only light shade.</li> </ul>
<i>Gleditsia triacanthos inermis</i> 'Skyline®'	<b>Skyline honeylocust</b>	4-7	50-60'	35-40'	<ul style="list-style-type: none"> <li>Rounded canopy comprised of several dominant ascending branches.</li> <li>Young trees may be more pyramidal with a central trunk.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>Thornless.</li> <li>Usually fruitless.</li> <li>Very little fall raking required.</li> <li>Available.</li> <li>Native.</li> </ul>

					•	<ul style="list-style-type: none"> <li>Requires little pruning or shaping.</li> <li><b><u>Potential problems</u></b></li> <li>Surface roots can lift sidewalks or interfere with mowing.</li> <li>Casts only light shade.</li> </ul>
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### KENTUCKY COFFEE TREE (*Gymnocladus dioicus*)

The Kentucky Coffee Tree is so-named because its pod contains seeds which used to be roasted as a coffee substitute, but the seeds and leaves can be poisonous to humans and animals when consumed. It is the state tree of Kentucky and native to North America.

This is a medium-growing tree that will reach a height of about 70 feet while spreading 45 to 60 feet. Kentucky Coffee Tree could be used more often because it is adaptable to many soils, including alkaline, has interesting bark and grows with an open canopy allowing light to penetrate to the ground for adequate turf growth beneath the canopy.

In the winter the tree forms an interesting silhouette of branches. Large seed pods that hang on the tree in the winter can be a litter problem when they fall in the spring.

Male trees are sometimes available and they do not set fruit, but this is often unreliable. The leaves are bipinnately compound and can be up to 18 inches

	Common name	Zones	Height	Spread	Ornamental traits	Planting considerations and comments
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<i>Gymnocladus dioicus</i> 'J.C. McDaniel' Prairie Titan®	Prairie Titan Kentucky Coffee Tree	3-8	40-50'	20-25'	<ul style="list-style-type: none"> <li>• Upright-spreading branching habit.</li> <li>• Interesting silhouette in winter.</li> <li>• The bark is deeply furrowed and dark brown in color.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Fruitless.</li> <li>• Very tolerant of most conditions.</li> <li>• Fast growing when young; moderate growth when older.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Leaves are poisonous to humans and animals.</li> </ul>
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### **DAWN REDWOOD (*Metasquoia glyptostroboides*)**

Dawn Redwood has an almost perfect pyramidal shape and grows 70 to 100 feet tall. It is similar in appearance to Bald Cypress. Although it closely resembles evergreens, the needles are deciduous. The orange-red to brown trunk base is outstanding as it tapers and thickens quickly with 8 to 12 large buttress-like root flares extending several feet up the tree in very distinctive manner. Butt flare) can be reduced somewhat by removing the lower branches at an early age.

The small, upright-spreading branches are well-attached to the typically straight trunk. The tree requires little if any pruning to maintain the pyramidal form. Lightning protection is recommended for older trees since they usually grow taller than most others.

	<b>Common name</b>	<b>Zones</b>	<b>Height</b>	<b>Spread</b>	<b>Ornamental traits</b>	<b>Planting considerations and comments</b>
<i>Metasquoia glyptostroboides</i> spp.	Dawn Redwood	4-8	70-100'	25'	<ul style="list-style-type: none"> <li>• Perfect pyramidal shape.</li> <li>• Emerging bright green needles turn yellow to golden red in fall; fissured, brown bark</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Requires little pruning.</li> <li>• Hearty areas with polluted air</li> <li>• Fast growing..</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Non-native.</li> <li>• Lightning protection is</li> </ul>

						<p>recommended for older trees because of their extreme height.</p> <ul style="list-style-type: none"> <li>• Does not do well in soil with high pH.</li> <li>• Late season growth vulnerable to early frosts.</li> <li>• Canker.</li> </ul>
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**BALD CYPRESS (*Taxodium distichum*)**

<i>Taxodium distichum</i>	Bald cypress	5-10	60-80'	20-35'	<ul style="list-style-type: none"> <li>• Deciduous conifer (similar to dawn redwood).</li> <li>• Young trees have a pyramid shape but eventually form an irregular flattened canopy.</li> <li>• The foliage is lacy and yellow-green, and turns golden brown and then red before falling.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Does well on dry sites and is fairly tolerant of drought.</li> <li>• Roots do not appear to lift sidewalks and curbs.</li> <li>• Long-term health usually not affected by pests.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Bagworms can defoliate portions of the tree.</li> </ul>
					<ul style="list-style-type: none"> <li>•</li> </ul>	

### **CORKTREE (*Phellodendron* spp.)**

*Phellodendron amurense* is native to eastern Asia (northern China, Manchuria, Korea, Ussuri, Amur, and Japan). It has interesting and corky bark. The tree can be used on alkaline soils and is resistant to insects and diseases.

	<b>Common name</b>	<b>Zones</b>	<b>Height</b>	<b>Spread</b>	<b>Ornamental traits</b>	<b>Planting considerations and comments</b>
<i>Phellodendron</i> <b>'His Majesty™</b>	Corktree	4	40'	35'	<ul style="list-style-type: none"> <li>• Mature specimens have short trunks with deeply ridged and corky bark.</li> <li>• Widely spreading crown.</li> <li>• Vase-shaped plant.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Male (no seeds).</li> <li>• Resistant to diseases and pests.</li> <li>• Tolerates intermittent drought.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• This tree demonstrates invasive characteristics in suburban and urban fringe forests in New York state and Pennsylvania.</li> <li>• Does not do well in restricted root zone areas.</li> </ul>

## OAK TREES (*Quercus* spp.)

	Common name	Zones	Height	Spread	Ornamental traits	Planting considerations and comments
<i>Quercus bicolor</i>	Swamp White Oak	4-8	50-60'	30-40'	<ul style="list-style-type: none"> <li>• Fall color often a poor but occasionally reddish-purple, golden, or golden-brown in excellent years.</li> <li>• Flaky bark.</li> <li>• Relatively small branches for oak.</li> <li>• Narrow, round-topped, open crown.</li> <li>• Shaped like inverted pyramid with rounded base.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Requires almost no maintenance.</li> <li>• Excellent drought resistant yet thrives in wet soils.</li> <li>• Native to North America.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Difficult species to transplant. For best results, plant only in the spring.</li> <li>• Susceptible to anthracnose, canker, powdery mildew, shoestring root rot and oak wilt.</li> <li>• Gypsy moth can cause significant damage in infested areas.</li> </ul>
<i>Quercus coccinea</i>	Scarlet Oak	4-9	50-60'	30-40'	<ul style="list-style-type: none"> <li>• Displays best and longest period of brilliant scarlet fall color.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Tolerate wet soils.</li> <li>• Prefers moist, rich, acid, well-</li> </ul>

					<ul style="list-style-type: none"> <li>• Crown with central trunk and lateral branches well spaced at two or three foot intervals.</li> <li>• Rounded, spreading canopy.</li> <li>• Trunk flares out at the base.</li> </ul>	<p>drained soils.</p> <ul style="list-style-type: none"> <li>• Native.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Does well in acidic soil only.</li> <li>• Less tolerant of adverse conditions than pin or red oak.</li> <li>• Difficult to transplant.</li> <li>• Flaring trunk could lift sidewalks and curbing if planted in narrow space.</li> <li>• Gypsy moths can cause significant damage in infested areas.</li> </ul>
<i>Quercus ellipsoidalis</i>	Northern Pin Oak	4-7	50-75'	30-40'	<ul style="list-style-type: none"> <li>• Fuzzy pink new leaves turn to glossy, bright green through summer; fall color is scarlet red.</li> <li>•</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Salt, drought, and heat resistant.</li> <li>• Native.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Intolerant of flooding conditions.</li> <li>• Quite susceptible to oak wilt.</li> <li>• Not easily transplanted.</li> <li>• Not widely available in the nursery trade.</li> <li>• Gypsy moths can cause significant damage in infested areas.</li> </ul>
<i>Quercus imbricaria</i>	Shingle Oak	4-7	50-60'	20-30'	<ul style="list-style-type: none"> <li>• Red tinged new green leaves turn to russet red in fall.</li> <li>• Prefers moist, rich, deep, well drained,</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Native.</li> <li>• Transplants with less difficulty than other oaks</li> </ul>

					<p>acidic soil.</p> <ul style="list-style-type: none"> <li>• Rounded canopy provides medium to deep shade.</li> <li>• Symmetrical canopy with a regular (or smooth) outline.</li> <li>• Individuals have more or less identical crown forms.</li> </ul>	<p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Lateral lower branches often droop.</li> <li>• Not always available.</li> <li>• Gypsy moths can cause significant damage in infested areas.</li> </ul>
<i>Quercus macrocarpa</i>	<b>Bur Oak</b>	3-8	60-70'	30-40'	<ul style="list-style-type: none"> <li>• Impressive crown, massive trunk, and stout branches.</li> <li>• Yellow fall color. Fall color is yellow-brown to chartreuse and usually poor.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Tolerant of most soils.</li> <li>• Withstands drought, wind, extreme cold, pollution, and salt.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Slow to medium growth rate.</li> <li>• Difficult to successfully transplant due to its coarse root system, including a deep tap root.</li> <li>• Gypsy moths can cause significant damage in infested areas.</li> </ul>
<i>Quercus muehlenbergii</i>	<b>Chinkapin Oak</b>	5-7	40-50'	40-50'	<ul style="list-style-type: none"> <li>• Yellow-orange fall color.</li> <li>• Ash-gray colored bark.</li> <li>• Usually wider than</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• More tolerant of alkaline soil than other oaks.</li> <li>• Native to Central Midwest and Eastern states.</li> </ul>

					tall at maturity.	<p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Does not tolerate salt well.</li> <li>• Considered somewhat difficult to transplant.</li> <li>• Gypsy moths can cause significant damage in infested areas.</li> </ul>
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### LINDEN TREES (*Tilia* spp.)

Although linden trees often occur at 40 to 50 feet in height, they frequently reach 80 to 100 feet. Young trees are pyramidal but mature specimens are upright with oval canopies and tall, straight trunks. Leaves are large, heart-shaped and deep green for most of the year but fade to yellow in autumn. Linden trees produce fragrant three-inch clusters of blooms in early summer.

Lower branches may droop as the tree matures and should be pruned so pedestrians and vehicles can pass. Linden trees are vulnerable to attack by Japanese beetles.

	<b>Common name</b>	<b>Zones</b>	<b>Height</b>	<b>Spread</b>	<b>Ornamental traits</b>	<b>Planting considerations and comments</b>
<i>Tilia americana</i> 'Sentry'	'Sentry' linden	3b-8	60'-80'	Half to two-thirds of height	<ul style="list-style-type: none"> <li>• Large, dark green heart-shaped leaves.</li> <li>• Yellow autumn color.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Prefers deep, moist, fertile soils.</li> <li>• pH adaptable.</li> <li>• Full sun - partial shade.</li> </ul>

						<p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Susceptible to Japanese beetle.</li> <li>• Requires pruning.</li> </ul>
<i>Tilia americana x euchlora</i> "Redmond"	Redmond Linden	3	35'	25'	<ul style="list-style-type: none"> <li>• This cultivar has a more upright habit so branches will not droop as much as the species.</li> <li>• Excellent shade tree for lawn.</li> <li>• Yellow fall color.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Readily transplanted.</li> <li>• Prefers moist, well-drained, fertile soil. Full sun. pH adaptable.</li> <li>• Drought tolerant.</li> <li>• Native.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Susceptible to Japanese beetle.</li> <li>• Requires pruning.</li> </ul>
<i>Tilia cordata</i> 'Greenspire®'	Greenspire Linden	3-7a	40-50'	15-25'	<ul style="list-style-type: none"> <li>• Leaves smaller, more delicate than species.</li> <li>• Dense pyramidal to oval crown which casts deep shade.</li> <li>• Yellow fall color.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Faster growth rate than species.</li> <li>• Does well in difficult conditions; widely used street tree.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Susceptible to Japanese beetle.</li> <li>• Requires pruning.</li> <li>• Not drought tolerant.</li> </ul>
<i>Tilia tomentosa</i> 'Sterling®'	Sterling Silver Linden	4-7	40-60'	20-30'	<ul style="list-style-type: none"> <li>• Dark green foliage with silver beneath.</li> <li>• Fragrant yellow blooms late summer.</li> <li>• Yellow fall color.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Adapts to dry conditions.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Susceptible to Japanese beetle.</li> <li>• Requires pruning.</li> <li>• This tree needs room to grow.</li> </ul>

## ELM TREES (*Ulmus* spp.)

Elm trees tend to grow rapidly when young. They are native to North America. They have a broad or upright, vase-shaped silhouette, and are quite massive when mature (80 to 100 feet high and 60 to 120 feet wide with trunks up to seven feet across). They have attractive, long leaves which are dark green through most of the year and with a yellow color in autumn. Their seeds are a source of food for birds and wildlife although seeds are only formed by mature trees. The copious amount of seeds can create a mess on hard surfaces. Trees have an extensive but shallow root system.

American elm trees were virtually wiped out by Dutch elm disease but many current varieties have resistance to man diseases.

	Common name	Zones	Height	Spread	Ornamental traits	Planting considerations and comments
<i>Ulmus japonica x wilsoniana</i> 'Morton'	Accolade Elm	4-7	70'	40-50'	<ul style="list-style-type: none"> <li>Glossy dark green foliage turns golden yellow.</li> <li>Good nursery form.</li> <li>Ultimate form like American elm.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>Tolerates urban sites and hot, dry conditions suffering no leaf scorch or dieback.</li> <li>Adapts to heavy and light soils once established.</li> <li>Very attractive foliage is resistant to elm leaf beetle feeding.</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>Always a possibility of disease and pest problems in elm trees.</li> </ul>
<i>Ulmus</i> 'Frontier'	Frontier Elm	5	40'	30'	<ul style="list-style-type: none"> <li>Smaller than species.</li> <li>Glossy green foliage; burgundy fall color.</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>Tolerates urban sites and hot, dry conditions suffering no leaf scorch or dieback.</li> <li>Adapts to heavy and light soils once established.</li> </ul>

						'Frontier' hybrid elm combines a high level of tolerance to Dutch elm disease, <b><u>Potential problems</u></b> <ul style="list-style-type: none"> <li>Moderate resistance to elm leaf beetle.</li> <li>Always a possibility of disease and pest problems in elm trees.</li> </ul>
<i>Ulmus</i> 'Commendation' <sup>TM</sup>	Commendation elm	4-7	70'	40-50'	<ul style="list-style-type: none"> <li>Has relatively uniform growth habit as a young tree with central leader that appears to be more dominant than those of the more rangy cultivars.</li> </ul>	<b><u>Attributes</u></b> <ul style="list-style-type: none"> <li>Fast growing, tough, robust.</li> </ul> <b><u>Potential problems</u></b> <ul style="list-style-type: none"> <li>'Commendation' is appealing to elm leaf beetle, Japanese beetle, and gypsy moth. Its use may be limited in areas where these insects are common.</li> </ul>
<i>Ulmus</i> 'New Horizon'	New Horizon Elm	3-7	50-70'	35-50'	<ul style="list-style-type: none"> <li>A compact, upright vase shaped tree with slightly arching branches. I</li> <li>Deep green, fine textured foliage which has rusty red tints in autumn.</li> </ul>	<b><u>Attributes</u></b> <ul style="list-style-type: none"> <li>Resistant to Dutch Elm Disease and Verticillium Wilt.</li> <li>Tolerant of urban conditions.</li> </ul> <b><u>Potential problems</u></b> <ul style="list-style-type: none"> <li>Always a possibility of disease and pest problems in elm trees.</li> </ul>
<i>Ulmus parvifolia</i>	Lacebark elm or Chinese elm	5b-10a	40-80'	35-50'	<ul style="list-style-type: none"> <li>Graceful, upright, rounded canopy of long,</li> <li>arching, and somewhat weeping</li> </ul>	<b><u>Attributes</u></b> <ul style="list-style-type: none"> <li>Medium growth rate.</li> <li>Shows resistance to elm leaf beetle and Japanese beetle</li> </ul>

					branches <ul style="list-style-type: none"> <li>• Two to three-inch-long, shiny, dark green, leathery leaves.</li> <li>• Some specimens grow in the typical vase-shaped elm form.</li> </ul>	<u><b>Potential problems</b></u> <ul style="list-style-type: none"> <li>• Bark is thin and easily damaged from mechanical impact.</li> <li>• Requires pruning for shape.</li> <li>• Borers and chewing insects may attack tree.</li> </ul>
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### JAPANESE ZELKOVA (*Zelkova serrate*)

Zelkova is often listed as a replacement for American elm since it has a similar vase shape although its branches are more numerous and smaller in diameter than American elm. Zelkova trees can be quite large, 90 to 100 feet tall with a 60 to 80-foot spread. The trunk is capable of growing to four feet or more in diameter. It prefers full sun and has a moderate growth rate. Leaves are 1.5 to 4 inches long, and turn brilliant yellow, orange, or burnt umber in the fall.

	<b>Common name</b>	<b>Zones</b>	<b>Height</b>	<b>Spread</b>	<b>Ornamental traits</b>	<b>Planting considerations and comments</b>
<i>Zelkova serrata</i> 'Village Green'	Village Green Zelkova	5-8	50-60'	50-60'	<ul style="list-style-type: none"> <li>• More upright and faster growing than the species.</li> <li>• Major branches grow very upright and provide easy clearance.</li> </ul>	<u><b>Attributes</b></u> <ul style="list-style-type: none"> <li>• More cold tolerant than species.</li> <li>• Tolerates air pollution, poor drainage, compacted soil, and/or drought.</li> </ul> <u><b>Potential problems</b></u> <ul style="list-style-type: none"> <li>• Susceptible to breakage either at</li> </ul>

						<p>the crotch due to poor collar formation, or the wood itself is weak and tends to break.</p> <ul style="list-style-type: none"> <li>• Branches on Zelkova are often clumped together on trunk at one point.</li> <li>• Double and multiple trunks or leaders with embedded bark are also common.</li> </ul>
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### AMERICAN OR EUROPEAN BIRCH (*Betula spp.*)

	Common name	Zones	Height	Spread	Ornamental traits	Planting considerations and comments
<i>Betula spp.</i>	American or European birch	3-6	35-75'	15-25'	<ul style="list-style-type: none"> <li>• Wonderful yellow fall color.</li> <li>• Irregular outline or silhouette.</li> <li>• Oval crown; pyramidal; weeping.</li> <li>•</li> </ul>	<p><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Does well in average soil.</li> <li>• Rapid growth.</li> <li>• Lawn grasses grow well in its light shade.</li> <li>•</li> </ul> <p><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• Doesn't tolerate dry or alkaline (clay) soil.</li> <li>• Branches are low but can be shaped.</li> <li>• Not native.</li> <li>• Extremely vulnerable to bronze birch borer.</li> <li>• Tree requires more care and</li> </ul>

						spraying than other ornamental trees.
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### TULIP TREE (*Liriodendron tulipifera*)

	Common name	Zones	Height	Spread	Ornamental traits	Planting considerations and comments
<i>Liriodendron tulipifera</i>	Tulip tree	5-9a	80-100'	30-50'	<ul style="list-style-type: none"> <li>• Fairly narrow oval crown.</li> <li>• Can reach massive size.</li> <li>• Gold to yellow fall color.</li> <li>• Scented, tulip-like, greenish-yellow flowers appear in mid-spring.</li> </ul>	<p style="text-align: center;"><b><u>Attributes</u></b></p> <ul style="list-style-type: none"> <li>• Moderate to rapid growth on good sites.</li> <li>• Native to North America.</li> </ul> <p style="text-align: center;"><b><u>Potential problems</u></b></p> <ul style="list-style-type: none"> <li>• May be subject to storm damage.</li> <li>• Poor soil salt tolerance.</li> <li>• Attacked by several cankers. Infected, girdled branches dieback from the tip to the point of infection.</li> <li>• Mites.</li> <li>• Powdery mildew.</li> </ul>