

# RECOMMENDED URBAN TREES FOR USDA PLANT HARDINESS ZONE 6 AND COLDER

## II. MEDIUM TO LARGE TREES (> 30') SUITABLE FOR CITY ENVIRONMENT PLANTINGS


**Scientific Name:** *Acer x freemanii* (*A. rubrum* x *A. saccharinum*)

**Common Name:** Freeman Maple

**Environmental Conditions:**

**Hardiness Zone:** 4

**Soil Moisture:**

VERY WET			VERY DRY								
											
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:**

**pH:** ≤ 7.5

**Insect/Disease Factors:** none serious or limiting, **Autumn Blaze®** shows more tolerance to leafhoppers than *A. rubrum*

**Growth Characteristics:**

**Height:** 45'-70'

**Width:** varies with cultivar, see cultivar chart on following page

**Form/Habit:** varies with cultivar, see cultivar chart on following page

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** greenish-yellow to red clusters, early spring, some showy red

**Fruit:** samara, sometimes reddish maturing to brown, seedless forms available

**Seasonal Foliage Color:** fall color varies with cultivar (yellow/orange/red), see cultivar chart on following page

**Bark:** typically attractive silver-gray

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** can develop graft incompatibility depending on understock used, specify own roots to avoid this delayed graft incompatibility problem

**Suggested Uses:** narrow or wide street tree lawns/pits, parks

**Cultivars:** see chart on following page



'Armstrong'

***Acer x freemanii* (Freeman Maple) Cultivars:**

<b>Cultivar</b>	<b>Width</b>	<b>Form/Habit</b>	<b>Foliage</b>	<b>Fall Color</b>	<b>Other</b>
<b>‘Armstong’</b> occasionally listed under <i>A. rubrum</i>	15’-20’	columnar/fastigiata, upright branching	resembles <i>A. saccharinum</i> , 5-lobed, silvery undersides	yellow to orange	fast grower, flowers not showy
<b>Autumn Blaze®</b> (‘Jeffersred’)	40’	broad oval, improved branch structure over <i>A. saccharinum</i> , dense, multi-stem form available	resemble <i>A. saccharinum</i> , deeply 5-lobed	excellent orange-red, long-lasting	fast grower, sparse flowering, nearly seedless
<b>Autumn Fantasy®</b> (‘DTR102’)	40’	broadly oval to upright-oval	more closely resembling <i>A. saccharinum</i> , 5-lobed	consistently bright red	fast growing
<b>Celebration™</b> (‘Celzam’)	20’-25’ maybe 40’	upright-pyramidal, strong branch angles	similar to <i>A. saccharinum</i> , dense	golden-yellow to red, reportedly turning from red to gold	red flower, seedless, fast growing in youth
<b>‘Marmo’</b>	35’-45’	broad columnar, strong central leader	5-lobed, intermediate between parents	excellent, often mottled red & green, can vary burgundy to orange or gold, colors early	good growth rate, seedless
<b>‘Morgan’</b> Canadian, can be known as <b>‘Indian Summer’</b> in U.S, sometimes listed under <i>A. rubrum</i>	40’	broadly oval, open habit		orange-red to red	very fast growing
<b>Saturn™</b> ‘Satzam’	35’-40’	broad oval	resembles <i>A. rubrum</i> , 3-lobed		reportedly virtually seedless
<b>Scarlet Sentinel™</b> (‘Scarsen’) occasionally still listed as <i>A. rubrum</i>	25’-35’	broad columnar to oval-rounded, ascending branches, improved branch structure over <i>A. saccharinum</i>	closely resembling <i>A. saccharinum</i> , 5-lobed	yellow to red	fast growing, bright red flowers, no fruit observed, reportedly shiny bark
<b>Sienna Glen®</b> ‘Sienna’	35’	pyramidal, strong central leader		rusty orange to burgundy	

\* ‘Armstong’, ‘Armstong Two’, Autumn Blaze®, ‘Marmo’, ‘Morgan’, and Sienna Glen® sometimes listed as Zone 3

**Scientific Name:** *Acer miyabei*  
**Common Name:** Miyabei Maple  
**Environmental Conditions:**  
**Hardiness Zone:** 5a (4b)  
**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade  
**Salt:** unknown  
**pH:** ≤ 8.2  
**Other:** State Street™ has reportedly good heat tolerance  
**Insect/Disease Factors:** relatively pest free  
**Growth Characteristics:**  
**Height:** 35’-45’  
**Width:** 30’  
**Form/Habit:** upright oval to rounded, can have open or dense branching, low branching tendency often creates short trunk  
**Rate:** medium  
**Ornamental Characteristics:**  
**Flower:** greenish-yellow, in pyramidal clusters, spring  
**Fruit:** samara  
**Seasonal Foliage Color:** flat to semi-glossy, medium to dark green in summer, yellow in fall, often holds green late so fall color is short-lived before leaves fall  
**Bark:** dark gray, typically rough and corky  
**Transplant Issues:** easy to transplant B&B or ≤ 2” caliper bare root  
**Management Issues:** none of significance  
**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™  
**Cultivars:** State Street™ (‘Morton’, zone 4, upright oval form, good uniform branching, dark green foliage, good golden yellow fall color, possibly fast growing)

**Scientific Name:** *Acer platanoides*

**Common Name:** Norway Maple

**Environmental Conditions:**

**Hardiness Zone:** 4a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			Consistently Moist, well Drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates full shade

**Salt:** some observed tolerance

**pH:**  $\leq 8.2$

**Other:** 'Summershade' considered more heat tolerant

**Insect/Disease Factors:** tar/black spot is a common serious aesthetic problem that can defoliate species in certain areas, susceptible to *Verticillium* Wilt (reportedly, **Parkway™**, **Jade Glen'** are tolerant, **'Summershade'** is moderately tolerant, **'Crimson King'** is the most susceptible) which can be a serious problem in some areas, susceptible to leafhoppers (reportedly **'Summer Shade'** is tolerant), **'Crimson King'** and reportedly **'Royal Red'** are more susceptible to pest problems than species, **'Deborah'** foliage more resistant to leaf scorch

**Growth Characteristics:**

**Height:** 40'-50' (can reach 90')

**Width:** 30'-50'

**Form/Habit:** oval to upright-oval or rounded to broadly oval

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** yellow to greenish yellow clusters, early spring before leave emerge

**Fruit:** 1 ½"-2" samara, mature in fall, abundant

**Seasonal Foliage Color:** dark green in summer, dark maroon color on some cultivars, yellow to brown in fall

**Bark:** not ornamentally important, gray-black with narrow ridges and shallow furrows

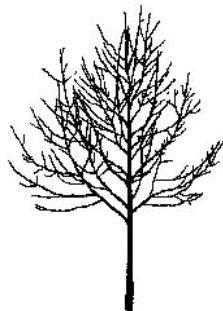
**Other:** foliage is typically very dense, foliage often held late

**Transplant Issues:** easy to transplant B&B or  $\leq 2$ " caliper bare root

**Management Issues:** over-planted in many communities, very likely to naturalize when planted next to open areas and will grow in shaded forest, tends to heave sidewalks unless adequate rooting space is provided, tendency to develop girdling roots, very dense foliage and shallow root system makes successful turf growth beneath difficult, bark split may be common in zone 4 conditions

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** see chart on following page



**'Superform'**  
(one of the rounded to broadly oval forms)

*Acer platanoides* (Norway Maple) cultivars:

Cultivar and Size	Noteworthy Foliage Characteristics	Other Noteworthy Characteristics
<b>Rounded to Broadly Oval</b>		
<b>‘Crimson King’</b> 40’high x 30’wide	dark maroon in summer, turn darker or brown-out in fall	maroon-yellow flowers, slower growing
<b>‘Deborah’</b> 50’high x 45’wide	thick, new growth emerges red-purple matures dark green in summer, yellow (orangey) in fall	straight central leader
<b>‘Drummondii’</b> 35’high x 30’wide	variegated, light green edged with white in summer, yellowish in fall	
<b>Emerald Lustre™ (‘Pond’)</b> 50’high x 45’wide	glossy, wavy margin, new leaves have reddish tint	sometimes listed as zone 3, good branching at early age, faster growing
<b>‘Emerald Queen’</b> 50’high x 40’wide	leathery, reddish tint in spring, bright yellow in fall	sometimes listed as zone 3, uniform growth, straight trunk, faster growing
<b>‘Jade Glen’</b> 45’high x 45’wide	yellow in fall	open habit, faster growing
<b>‘Princeton Gold’</b> 35’high x 30’wide	emerges bright yellow in spring, may fade in summer, darker yellow in fall	
<b>Medallion™ (‘Medzam’)</b> 45’high x 35’-40’wide	thick glossy, red and gold in fall	dense branching
<b>‘Royal Red’</b> 40’high x 30’wide	glossy, dark maroon in summer, turn darker or browns out in fall	reportedly slightly hardier & slower growing than ‘Crimson King’
<b>‘Summershade’</b> 50’high x 40’wide	leathery, leafs out late in spring and holds late in fall, yellow in fall	zone 4b, faster growing
<b>‘Superform’</b> 50’high x 45’wide	yellow in fall	symmetrical, uniform branching angles, straight trunk
<b>Oval to Upright Oval</b>		
<b>‘Cleveland’</b> 45’high x 25’-30’wide	good golden-yellow in fall	good branching habit
<b>‘Columnare’</b> 50’high x 15’-20’wide	darker green in summer, golden-yellow in fall	sometimes listed as zone 3, moderate growth rate
<b>Conquest™ (‘Conzam’)</b> 30’-35’high x 8’-10’wide	dark maroon changes to deep green in summer, bright red in fall	dense branching
<b>‘Crimson Sentry’</b> 25’high x 15’wide	dark maroon to purple in summer	sometimes listed as zone 4b, dense branching, almost pyramidal, slower growing than ‘CrimsonKing’
<b>Easy Street™ (‘Ezeste’)</b> 40’high x 20’wide	yellow in fall	almost pyramidal, faster growing
<b>‘Fairview’</b> 45’high x 35’wide	reddish purple new growth, matures to bronze-green in summer	
<b>Parkway™ (‘Columnarbroad’)</b> 40’high x 25’wide	yellow in fall	sometimes listed as zone 3, strong central leader, good branching, faster growing

**Scientific Name:** *Acer pseudoplatanus*

**Common Name:** Sycamore Maple

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** tolerant of both soil and air-borne salts

**pH:**  $\leq 8.2$

**Insect/Disease Factors:** none serious or limiting, the more common cultivar ‘**Atropurpureum**’ (also known as ‘**Spaethii**’ or ‘**Purpureum**’) is likely not as tolerant as straight species (aphids favor, may have problems with leaf scorch, sunscald, and/or borer infestations)

**Growth Characteristics:**

**Height:** 40’-60’

**Width:** 30’-50’

**Form/Habit:** oval to rounded crown, upright spreading branching

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** yellow-green clusters, spring after leaves

**Fruit:** 1 ¼”-2” long samara

**Seasonal Foliage Color:** dark green in summer, brown to poor yellow in fall

**Bark:** gray and reddish brown, flaking into scales and exposing orange-brown inner bark

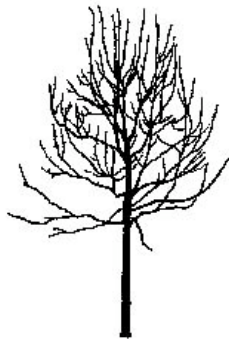
**Other:** more leathery foliage than *A. platanoides*

**Transplant Issues:** easy to transplant B&B or  $\leq 2$ ” caliper bare root

**Management Issues:** species naturalizes freely when planted next to open areas

**Suggested Uses:** narrow or wide street tree lawns/pits (popular street tree in Europe), parks, suitable for CU-Structural Soil™

**Cultivars:** many common in Europe, few rarely available in the United States, ‘**Atropurpureum**’ (also known as ‘**Spaethii**’ or ‘**Purpureum**’) is not highly recommended due to above mentioned potential insect and disease problems



**Scientific Name:** *Acer rubrum*

**Common Name:** Red Maple

**Environmental Conditions:**

**Hardiness Zone:** 3b, choose zone appropriate seed source if cultivar not selected

**Soil Moisture:**

Cultivar	VERY WET			VERY DRY								
	occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
Red Sunset® 'Bowhall'	1	2	3	4	5	6	7	8	9	10	11	12
'Autumn Flame' October Glory®	1	2	3	4	5	6	7	8	9	10	11	12
Northwood® 'Karpick'	1	2	3	4	5	6	7	8	9	10	11	12

\*flood tolerance of above cultivars is listed on cultivar chart on following page

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 7.0

**Insect/Disease Factors:** susceptible to *Verticillium* Wilt and leaf hoppers, 'Brandywine', 'Red Rocket', 'Somerset' and 'Sun Valley' show good potato leafhopper (which can cause leaves to scorch) resistance, occasionally borers attack young terminals

**Growth Characteristics:**

**Height:** 35'-60'

**Width:** 30'-70'

**Form/Habit:** pyramidal in youth, narrow upright to rounded with age, greatly varies, see cultivar chart on following page

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** showy, red, sometimes yellow to orange, small clusters in spring before leaves

**Fruit:** samara, often red, late spring to early summer

**Seasonal Foliage Color:** leaves emerge reddish in spring, green in summer, color varies in fall (yellow, orange, red), see cultivar chart on following page

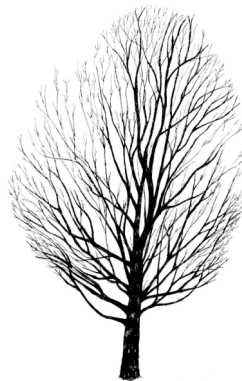
**Bark:** attractive silver-gray in youth

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** thin bark can be easily damaged, delayed graft incompatibility can be a problem, should specify as 'own-rooted' when possible

**Suggested Uses:** narrow or wide street tree lawns/pits, parks

**Cultivars:** see chart on following page



***Acer rubrum* (Red Maple) cultivars:**

<b>Cultivar</b>	<b>Zone</b>	<b>Width</b>	<b>Form/Habit</b>	<b>Fall Color</b>	<b>Flood Tolerance</b>	<b>Other</b>
‘Autumn Flame’	3b	35’-55’	round, dense, good branch structure, symmetrical	red, early, long-lasting	medium	fruitless, red-brown 1 year old twigs, smaller leaves
‘Autumn Radiance’	4	40’	oval to rounded	red, early		
‘Autumn Spire’	3	20’-25’	broad columnar, upright branching	red, early		
‘Bowhall’	4	15’-25’	narrow columnar, upright, symmetrical	orange, variable	high	pale orange flowers, slower growing
‘Brandywine’	4	35’	oval to round	red to purple-red, late turning		
<b>Burgundy Belle®</b> (‘Magnificent Magenta’)	4	45’	broadly-oval, dense, symmetrical	bright red changing to burgundy		
<b>Fairview Flame®</b>	4	30’	oval to round	scarlet red		
<b>Fireball™</b> (‘Firzam’)	4	25’-30’	narrow pyramidal, dense, symmetrical	red and gold		
‘Karpick’	4	15’-25’	narrow columnar, upright, dense	yellow or red, variable	low	red twigs, red fruit, fast growing
‘New World’	4	20’	upright, narrow oval	orange-yellow to orange-red		seedless
<b>Northwood®</b>	3b (3a)	35’	round, somewhat irregular, straight trunk, good branch structure	orange-red	low	orange-red flowers, seedless
<b>October Glory®</b> (‘PNI 0268’)	5a	35’-45’	round	red, late turning, holds leaves late	medium	bright red flowers, glossy leaves
<b>Redpointe™</b> (‘Frank Jr’)	4	30’	broadly-pyramidal, strong central leader	bright red		fast growing
<b>Red Sunset®</b> (‘Franksred’)	4b (4a)	35’-45’	oval to round, upright branching, good branch structure, symmetrical, clump form available	orange-red, leaves hold late	high	bright red fruit, thick glossy leaves
‘Schlesingeri’	4 (3)	45’	broad vase-shaped to rounded, dense	orange to red, often paler tones, early, often long-lasting color		
‘Somerset’	4	30’	oval to round	red		
‘Sun Valley’	4	35’	oval, dense, symmetrical	red		seedless
<b>Supersonic™</b> (‘Supszam’)	4	10’	columnar, tightly-branched	gold, tinted red		



**Scientific Name:** *Acer saccharum*

**Common Name:** Sugar Maple

**Environmental Conditions:**

**Hardiness Zone:** 4 (3b with selection of appropriate genetic material)

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

\* **Adirondak**<sup>®</sup>, **Crescendo**<sup>™</sup>, **Fiddler's Creek**<sup>™</sup>, **'Legacy'**, and **Steeple**<sup>™</sup> reportedly better drought tolerance than species, **'Caddo'** (a western ecotype) is extremely drought tolerant

\* *Acer nigrum*, Black Maple, is closely related to *A. saccharum*, although it has a higher drought-tolerance, the *A. nigrum* selection **'Greencolumn'** is included on cultivar chart on following page

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 7.5

**Other:** heat sensitive, **Apollo**<sup>™</sup>, **Bonfire**<sup>™</sup>, **Commemoration**<sup>™</sup>, **Crescendo**<sup>™</sup>, **'Legacy'**, and **Steeple**<sup>™</sup> reportedly more heat tolerant than species, **'Caddo'** (a western ecotype) is extremely heat tolerant

**Insect/Disease Factors:** *Verticillium* wilt can be a serious problem in some areas, leaf scorch can be serious (reportedly **'Goldspire'** is moderately resistant, **'Endowment'** and **'Wright Brothers'** are resistant, and **'Goldspire'** is highly resistant), **Bonfire**<sup>™</sup> shows good leafhopper resistance

**Growth Characteristics:**

**Height:** 45'-50' typical, 60'-75' possible (can grow 100'+ in wild)

**Width:** 35'-40' typical, 55'-70' possible

**Form/Habit:** oval to round

**Rate:** slow to medium

**Ornamental Characteristics:**

**Flower:** pale yellow pendulous clusters, early spring before leaves emerge

**Fruit:** 1" samara

**Seasonal Foliage Color:** medium to dark green in summer, varies from yellow, orange, to bright red in fall, typically excellent fall color

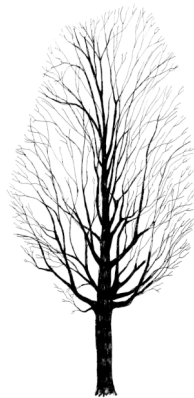
**Bark:** smooth gray bark in youth becomes furrowed with long scaly plates with age

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** none of significance

**Suggested Uses:** wide street tree lawns/pits due to drought sensitivity, parks

**Cultivars:** see chart on following page



***Acer saccharum* (Sugar Maple) cultivars:**

<b>Cultivar</b>	<b>Height</b>	<b>Width</b>	<b>Foliage</b>	<b>Fall Foliage</b>	<b>Growth Rate and Form/Habit variations from species</b>
<b>Adirondak®</b> (‘Adirzam’)	60’-75’	25’-30’	glossy, dark green	golden-orange, turns and holds color late	pyramidal habit, dense
<b>Apollo®</b> (‘Barrett Cole’)	25’	10’	dark green	variable	dense branching, symmetrical
‘Arrowhead’	60’	30’-40’	large, dark green	yellow to orange	pyramidal, strong central leader, dense branching
‘Autumn Splendor’	45’	40’	glossy green	orange-red	heat, drought, and leaf tatter resistant, adaptable to Great Plains region
<b>Bonfire™</b>	50’-65’	40’-50’	medium green	bright orange to red	faster growing
‘Caddo’ (describes a western ecotype)	30’-50’	variable	leathery, deeply lobed, dark green	variable, can be very showy	variable form/habit
‘Commemoration’	50’-60’	30’-35’	thick, glossy, dark green, tatter resistant	variable, turns early, drops foliage late	faster growing, dense branching, develops heavy caliper earlier
<b>Crescendo™</b> (‘Morton’)	45’ or 30’	40’	dark green	orange-red to red	
‘Endowment’	50’	20’	dark green	bright yellow, sometimes orange-red	slower growing
<b>Fall Fiesta™</b>	50’-75’	50’	glossy, thick, leathery, tatter resistant	variable	faster growing
‘Fairview’	55’	40’		orange-red	rapid trunk growth, well branched crown
<b>Fiddler’s Creek™</b> (‘Fidcezam’)	40’-50’	20’-25’	large, deeply cut, thick, leathery, glossy	variable	faster growing, dense
‘Goldspire’	40’-45’	12’-20’	leathery, dark green	bright yellow-orange	slower growing, dense
<i>A. nigrum</i> ‘Greencolumn’	50’	20’-25’	medium green	yellow to apricot-orange	upright, narrow, maintains central leader, columnar in youth
<b>Green Mountain®</b>	70’ (45’)	45’ (35’)	thick, leathery, dark green, tatter resistant	variable	faster growing, uniform growth, upright habit
‘John Pair’ only hardy to Zone 5	30’	30’	glossy green	red	heat resistant, adaptable to Great Plains region
‘Legacy’	50’	35’	glossy, thick, leathery, dark green, tatter resistant	variable	faster growing, dense, symmetrical at early age
<b>Majesty®</b> (‘Flax Mill’)	50’-80’	40’-50’	dark green	orange to red	faster growing, develops heavy caliper and full branching earlier, symmetrical
‘Seneca Chief’	50’	30’	dark green, larger	golden-orange	faster growing, muscle-like bark, dense branching
<b>Steeple®</b> (‘Astis’) *cold hardy only to zone 5	45’	20’	dark green	yellow-orange	narrow, symmetrical
‘Sugar Cone’	25’	13’	dense	yellow	compact form, slow growing
‘Wright Brothers’ (formerly ‘Moraine’)	50’-75’	35’		variable	faster growing, develops heavy caliper earlier

\* ‘Arrowhead’, Adirondak®, Green Mountain®, Majesty®, ‘Seneca Chief’, ‘Sugar Cone’, ‘Wright Brothers’ sometimes listed as Zone 3

**Scientific Name:** *Aesculus x carnea* (*A. hippocastanum* x *A. pavia*)

**Common Name:** Red Horsechestnut

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Insect/Disease Factors:** less susceptible (but not immune) to leaf scorch, leaf blotch and reportedly milder than Common Horsechestnuts (*A. hippocastanum*), potential fungal disease problems, sun-scald on trunks can be a problem in Zone 5a, 'Fort McNair' is reportedly more resistant to leaf scorch and leaf blotch

**Growth Characteristics:**

**Height:** 35'-50'

**Width:** 30'

**Form/Habit:** oval to round, typically dense

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** 6"-8" tall, pink to red, upright pyramidal clusters, late spring

**Fruit:** glossy brown nuts in 1 ½" slightly prickly capsules

**Seasonal Foliage Color:** dark green in summer, no notable fall color

**Bark:** typically not ornamentally important, dark gray to brown, potentially becoming platy and exfoliating

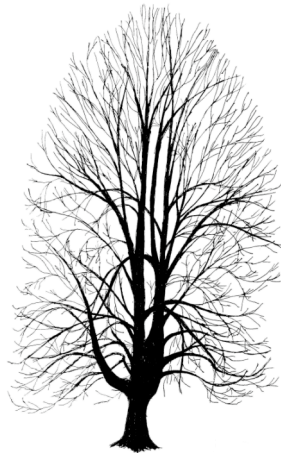
**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** flower, fruit, leaf and twig litter may be a problem in some areas

**Suggested Uses:** narrow or wide street tree lawns/pits, parks

**Cultivars:** 'Briotii' (sometimes listed as Zone 4, bright red flowers in longer (10") clusters, deep green foliage, reportedly nearly fruitless), 'O'Neill' (red flowers in longer, (10-12") clusters, lighter green foliage), 'Fort McNair' (pink flowers with yellow throats)

**Related Species:** *Aesculus octandra*, **Yellow Buckeye** (sometimes still listed as *A. flava*), zone 4, 60' high, 40' wide, 7" long yellow-green flower, may have yellow to orange fall color



**Scientific Name:** *Alnus glutinosa*

**Common Name:** European Alder or Black Alder

**Environmental Conditions:**

**Hardiness Zone:** 4a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** numerous insects and diseases are potentially problematic (including leaf miners, tent caterpillars, woody alder aphids, and cankers)

**Growth Characteristics:**

**Height:** 40'-60'

**Width:** 20'-40'

**Form/Habit:** pyramidal to oval, multi-stem form available, should specify single-stem form

**Rate:** fast in youth, slows down with age

**Ornamental Characteristics:**

**Flower:** not typically considered ornamental, yet attractive, male - reddish-brown, 2"-4" long catkins open yellow, female - purple, in an upright egg-shaped strobile, both spring

**Fruit:** small winged nutlets inside ½" long, egg-shaped pine cone-like fruit, persists through winter

**Seasonal Foliage Color:** dark glossy green in summer, typically no fall color, yellow possible

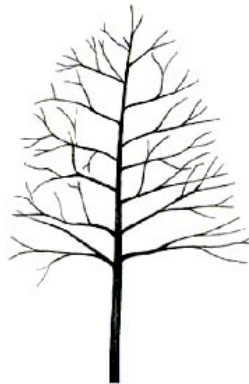
**Bark:** attractive, lustrous gray-green to green-brown in youth, polished brown with age

**Transplant Issues:** easy to transplant B&B, moderately difficult to transplant bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2" caliper trees bare root

**Management Issues:** relatively short lived, may naturalize when planted next to open areas

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, good for reclamation sites (fixes own nitrogen), often used for windbreaks

**Cultivars:** 'Pyramidalis' or 'Fastigiata' (upright columnar habit, 10'-15' wide, somewhat denser and lower branched)



**Scientific Name:** *Betula nigra* ‘Cully’ and ‘BNMTF’

**Common Name:** Heritage® and Dura-Heat™ River Birch

**Environmental Conditions:**

**Hardiness Zone:** 4b (4a)

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** unknown

**pH:** ≤ 7.0

**Other:** Dura-Heat™ is reportedly heat tolerant

**Insect/Disease Factors:** resistant to bronze birch borer, less prone to leaf-spot than species, Dura-Heat™ is aphid resistant

**Growth Characteristics:**

**Height:** 40’-50’

**Width:** 30’-40’

**Form/Habit:** broadly pyramidal to oval, vigorous grower, multi-stem or single-stem forms available, Dura-Heat™ has dense compact appearance

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** 2”-3” slender dark brown catkins

**Fruit:** not ornamentally important, inconspicuous, small nutlets inside catkins

**Seasonal Foliage Color:** glossy, Heritage® is light green in summer, Dura-Heat™ is dark green, both turn yellow in fall

**Bark:** strongly exfoliating, cream and tan, Heritage® exfoliates pinkish-orange as well

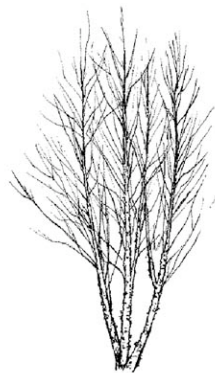
**Other:** Heritage® has larger leaves than straight species, Dura-Heat™ has smaller leaves than straight species

**Transplant Issues:** moderately difficult to transplant bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2” caliper trees bare root, best planted B&B

**Management Issues:** can be low branched, may require pruning to be used as street tree

**Suggested Uses:** narrow or wide street tree lawns/pits (preferably wide lawns/pits for multi-stem form), parks

**Cultivars:** above information is specific to cultivars



**Clump Form**

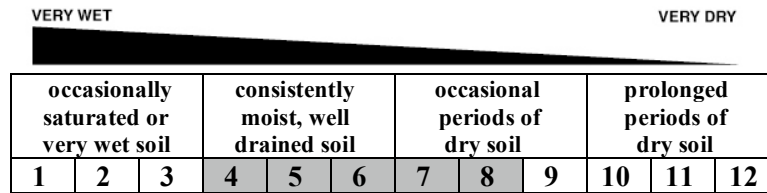
**Scientific Name:** *Betula populifolia* ‘Whitespire Sr.’ (cultivar formerly listed as *Betula platyphylla* var. *japonica*, Asian White Birch)

**Common Name:** Whitespire Sr. Gray Birch

**Environmental Conditions:**

**Hardiness Zone:** 4a

**Soil Moisture:**



**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 7.5

**Other:** reportedly better heat tolerance than most Birch but not as good as previously listed River Birch cultivars Heritage® and Dura-Heat™

**Insect/Disease Factors:** shows some resistance to bronze birch borer, reportedly leafhopper resistant

**Growth Characteristics:**

**Height:** 40’

**Width:** 25’

**Form/Habit:** pyramidal to oval, available in multi-stem or single-stem forms, specify desirable form

**Rate:** medium (possibly fast)

**Ornamental Characteristics:**

**Flower:** catkins

**Fruit:** not ornamentally important, inconspicuous, small nutlets inside catkins

**Seasonal Foliage Color:** glossy, dark green in summer, yellow in fall

**Bark:** attractive, grayish-white, with black markings, doesn’t exfoliate

**Transplant Issues:** moderately difficult to transplant bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2” caliper trees bare root, best planted B&B

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits(preferably wide lawns/pits for multi-stem form), parks

**Cultivars:** above information is cultivar specific, ‘Whitespire Jr.’ not recommended because of genetic variability due to seed propagation

**Scientific Name:** *Carpinus betulus*

**Common Name:** European Hornbeam

**Environmental Conditions:**

**Hardiness Zone:** 5a (4)

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 8.2

**Insect/Disease Factors:** none serious or limiting, leaf minor possible, two-lined chestnut borer sometimes attacks ‘**Fastigiata**’

**Growth Characteristics:**

**Height:** 40’-60’

**Width:** 30’-40’

**Form/Habit:** pyramidal to rounded in youth, oval to rounded at maturity, fine textured branches, low branching tendency typically creates short trunk

**Rate:** slow to medium

**Ornamental Characteristics:**

**Flower:** catkins with light-green bracts, spring

**Fruit:** small green-brown nutlets at base of leafy flower bracts in pendulous clusters, mature in fall

**Seasonal Foliage Color:** dark green in summer, yellow to yellow-green in fall, fall color is often late

**Bark:** attractive, smooth slate-gray

**Transplant Issues:** difficult to transplant B&B or bare root, somewhat slow to establish

**Management Issues:** typically low branched, may require pruning to be used as street tree, tolerates heavy pruning, dieback can be a minor problem, narrow branch angles on columnar forms may be problem with heavy snow/ice loads

**Suggested Uses:** wide street tree lawns/pits, narrow tree lawns/pits with pruning, parks, suitable for CU-Structural Soil™, columnar forms useful for screening or hedging

**Cultivars:** ‘**Fastigiata**’ (35’-40’ high, 20’-30’ wide, narrowly conical becoming broadly oval-vase shaped with age, very dense branching), ‘**Columnaris**’ (another upward branching and compact crown form commonly confused with ‘Fastigiata’ in the nursery trade, theoretically ‘Columnaris’ develops a central leader and ‘Fastigata’ does not), ‘**Pyramidalis**’ (just another name given to ‘Fastigiata’ and ‘Columnaris’ forms), ‘**Franz Fontaine**’ (35’-40’ high, 15’ wide, narrowest form available, maintains narrow-columnar form with age as currant season’s growth curves inward toward central leader)



‘**Fastigiata**’

**Scientific Name:** *Catalpa speciosa*

**Common Name:** Northern Catalpa

**Environmental Conditions:**

**Hardiness Zone:** 4a

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:**  $\leq 8.2$

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 50'-60' typical, can reach over 100'

**Width:** 20'-40'

**Form/Habit:** narrow, open, irregular-oval

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** showy, white, orchid-like with yellow and/or purplish spots inside, large 6" upright clusters, early to mid summer

**Fruit:** 8"-20" long, thin, pendulous pods, green changing to brown, persistent throughout winter

**Seasonal Foliage Color:** bright to medium green in summer, poor yellow-green to brownish in fall

**Bark:** dark grayish brown, old trunks are ridged and furrowed or thick and scaly

**Transplant Issues:** easy to transplant B&B or  $\leq 2$ " caliper bare root

**Management Issues:** fruit litter could be a nuisance in some areas

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** none known



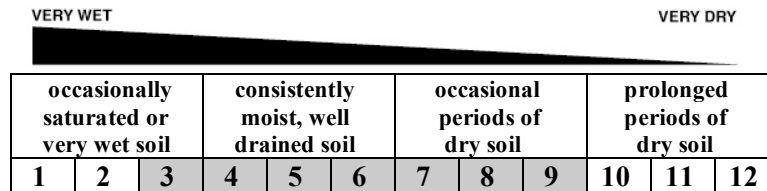
**Scientific Name:** *Celtis laevigata*

**Common Name:** Sugar Hackberry, Southern or Mississippi Hackberry

**Environmental Conditions:**

**Hardiness Zone:** 6a (cultivars reportedly zone 5)

**Soil Moisture:**



**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** unknown

**pH:**  $\leq 7.5$

**Other:** good heat and wind tolerance

**Insect/Disease Factors:** resistant to witches' broom and nipple gall, '**Magnifica**' resistant leafhoppers

**Growth Characteristics:**

**Height:** 60'-80'

**Width:** similar to height, 60'+

**Form/Habit:** rounded with spreading, often pendulous branches

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous clusters

**Fruit:** small orange-red to blue-black drupes in fall

**Seasonal Foliage Color:** light green in summer, dull yellow in fall

**Bark:** smooth light gray with corky/warty ridges

**Other:** foliage is smaller than *C. occidentalis*

**Transplant Issues:** moderately difficult to transplant bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2" caliper trees bare root, best planted B&B, somewhat slow to establish

**Management Issues:** '**All Seasons**' twigs are heavier than average for species and less likely to shed

**Suggested Uses:** wide street tree lawns/pits due to size, '**All Seasons**' can be used in narrow street tree lawns/pits, parks

**Cultivars:** '**All seasons**' (reportedly zone 5, 40'-50' high, 30'-40' wide, fast growing, well balanced crown with ascending branches, fine textured foliage, good yellow fall color, red fruit, American Beech-like bark is smooth silver-gray with few corky ridges), '**Magnifica**' (*C. occidentalis* and *C. laevigata* hybrid, reportedly zone 5, broadly oval to vase-shaped, fast growing, nearly sterile – little to no fruit)

**Scientific Name:** *Celtis occidentalis*  
**Common Name:** Common Hackberry  
**Environmental Conditions:**

**Hardiness Zone:** 3b (3a, 2b)  
**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** unknown

**pH:** ≤ 8.2

**Other:** good heat and wind tolerance

**Insect/Disease Factors:** susceptible to various problems, although most rarely serious or limiting, except witches' broom, which can disfigure form with abnormal branch growth (broom-like clusters)

**Growth Characteristics:**

**Height:** 40'-60'

**Width:** similar to height, 40'+

**Form/Habit:** pyramidal when young, irregular-rounded when mature, open branching, somewhat elm-like with ascending then arching branches

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous clusters, spring as leaves are emerging

**Fruit:** yellow or orange-red to dark purple drupe, fall

**Seasonal Foliage Color:** light to medium green in summer, yellow in fall

**Bark:** gray with rough and corky ridges

**Transplant Issues:** moderately difficult to transplant bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2" caliper trees bare root, best planted B&B, somewhat slow to establish

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** 'Prairie Pride' (zone 3b or 4, rapid grower, compact uniform crown, thick leathery lustrous foliage, dark red-purple fruit, lighter fruit crop than species), **Prairie Sentinel®** ('KSU-1', 10' wide, fastigate form)



**Scientific Name:** *Cercidiphyllum japonicum*

**Common Name:** Katsura Tree

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** unknown

**pH:**  $\leq 8.2$

**Other:** protected site best

**Insect/Disease Factors:** relatively pest free, resistant to *Verticillium Wilt*

**Growth Characteristics:**

**Height:** 40'-60' (can reach 100' in the wild)

**Width:** quite variable, 25'-60'

**Form/Habit:** upright pyramidal when young, round with age, multi-stem or single-stem forms available

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** early spring before leaves emerge

**Fruit:** small  $\frac{1}{2}$ "-  $\frac{3}{4}$ " pods in clusters (resemble tiny banana bunches)

**Seasonal Foliage Color:** new leaves emerge bright red-purple, becoming bluish-green in summer, good yellow to apricot-orange in fall

**Bark:** attractive, shaggy brown

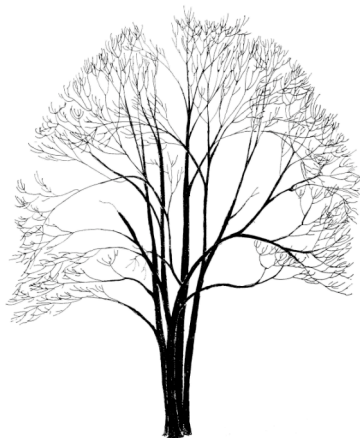
**Other:** yellow leaves in fall have a cotton-candy scent

**Transplant Issues:** easy to transplant B&B or  $\leq 2$ " caliper bare root

**Management Issues:** trunk sunscalds easily when young

**Suggested Uses:** wide street tree lawns/pits and parks due to size and drought sensitivity

**Cultivars:** weeping forms (*f. pendula* and *f. pendula* 'Morioka Weeping') available but not suitable for street tree use



**Scientific Name:** *Cladrastis kentukea*

**Common Name:** Yellowwood

**Environmental Conditions:**

**Hardiness Zone:** 4b

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Insect/Disease Factors:** relatively pest free

**Growth Characteristics:**

**Height:** 30'-50'

**Width:** 40'-55'

**Form/Habit:** broadly rounded, graceful arching habit, branches low and typically loses central leader, may need to specify single-stem for street tree use due to multi-stemmed potential

**Rate:** medium-fast

**Ornamental Characteristics:**

**Flower:** showy, fragrant, white, 8"-14" long pendulous clusters, late spring (bi-annually)

**Fruit:** brown, 3" long seed pods, ripening in fall

**Seasonal Foliage Color:** bright green in summer, yellow in fall

**Bark:** attractive smooth gray

**Other:** yellow leaf axis (rachises) persist after leaflets fall off in fall, prolonging seasonal interest

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** prune only in summer as profuse bleeding will occur other times of the year, can be weak wooded with poor crotch angles that split out as the tree grows older, pruning may be needed in youth to develop desired trunk form or for use as a street tree, thin bark sensitive to mechanical damage

**Suggested Uses:** wide street tree lawns/pits, narrow tree lawns/pits with pruning, parks

**Cultivars:** 'Rosea' (sometimes called 'Perkins Pink') a pink flowering form, may be difficult to find



**Scientific Name:** *Corylus colurna*

**Common Name:** Turkish Filbert

**Environmental Conditions:**

**Hardiness Zone:** 5a (4b)

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Other:** heat tolerant once established

**Insect/Disease Factors:** occasionally eastern filbert blight can be a serious problem in some areas, leaves fairly resistant to leaf scorch

**Growth Characteristics:**

**Height:** 40'-60'

**Width:** 20'-40'

**Form/Habit:** broadly pyramidal, conical

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** 2"-3" long, pendulous male catkins, late winter to early spring, female flowers inconspicuous

**Fruit:** edible nuts inside textured and fringed 2" husks

**Seasonal Foliage Color:** dark green and leathery in summer (although species variable), potentially yellow to purple in fall, often leaves drop yellow-green

**Bark:** gray-brown, flakes and scales with age on trunk and older branches, exposing orange-brown inner bark

**Transplant Issues:** difficult to transplant bare root, best planted B&B

**Management Issues:** fruit may be a litter problem

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** none available



**Scientific Name:** *Eucommia ulmoides*

**Common Name:** Hardy Rubber Tree

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Other:** heat tolerant

**Insect/Disease Factors:** relatively pest free

**Growth Characteristics:**

**Height:** 40'-60'

**Width:** 40'-60'

**Form/Habit:** very sparsely branched in youth, rounded to broad-spreading at maturity

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** 1 ½" winged capsule on female trees

**Seasonal Foliage Color:** attractive glossy dark green in summer, fall color often nonexistent or poor yellow-green

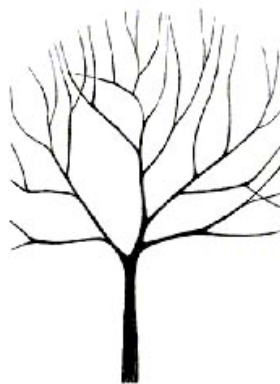
**Bark:** gray-brown, becomes ridged and furrowed with age

**Transplant Issues:** easy to transplant B&B

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** none available



**Scientific Name:** *Fraxinus americana*

**Common Name:** White Ash

**Environmental Conditions:**

**Hardiness Zone:** 4a (some cultivars to 3)

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** Ashes are susceptible to a number of insect and disease problems, ash borer (in hot dry environments) and ash yellows (in the Eastern and Midwestern United States) may be the most serious, all *Fraxinus* are very susceptible to Emerald Ash Borer, do not use in midwest or northeast where Emerald Ash Borer exists or is moving toward the region

**Growth Characteristics:**

**Height:** 50'-70'

**Width:** 40'-60'

**Form/Habit:** oval to rounded and open with age, maintains good central leader in youth

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous

**Fruit:** not ornamentally important, 1"-2" long samara, male seedless cultivars available

**Seasonal Foliage Color:** dark green in summer, color variable in fall (yellow to purple), certain cultivars selected for good reddish to purple color in fall

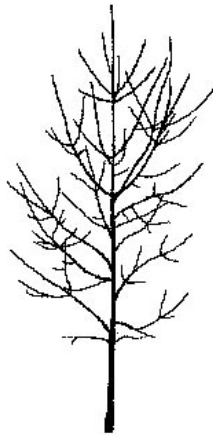
**Bark:** gray to gray-brown, narrow interlacing ridges create diamond shaped furrows

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** fruit litter can be a problem in some areas, non-fruiting cultivars available, graft incompatibility problems have been observed on some cultivars

**Suggested Uses:** narrow or wide street tree lawns/pits, wide street tree lawns/pits preferred for straight species due to tree size, parks, suitable for CU-Structural Soil™

**Cultivars:** see chart on following page



***Fraxinus americana* (White Ash) Cultivars:**

<b>Cultivar</b>	<b>Zone</b>	<b>Form/Habit</b>	<b>Fall Color</b>	<b>Fruiting/ Non-fruiting</b>	<b>Other</b>
<b>‘Autumn Applause’</b>	5a	oval, dense branching	maroon, early turning and long lasting	non-fruiting	young trees subject to bark splitting at ground level
<b>‘Autumn Blaze’</b>	3	oval	purple	light fruit set	
<b>Autumn Purple®  (‘Junginger’)</b>	5a	round	reddish-purple to deep red	non-fruiting	fast growing, glossy leaves
<b>‘Champaign County’</b>	4a (5a)	dense, strong central leader, heavy trunk	not much, yellow to purple possible	little to no fruiting observed	lustrous dark green leaves
<b>‘Chicago Regal’</b>	4a	oval to rounded, symmetrical branching	orange to purple, mixed with earth tones	non-fruiting	fast growing, larger foliage, bark resistant to frost cracking
<b>‘Empire’</b>	3	narrow oval (25’ wide), strong central leader	rusty orange to purple	non-fruiting	
<b>‘Rose Hill’</b>	5b	upright oval to pyramidal, sturdy branching	bronze-red to purple	non-fruiting	
<b>‘Royal Purple’</b>	4a	oval, upright habit	purple	fruiting	vigorous grower in youth, bark resistant to frost cracking
<b>Skyline®  (‘Skycole’)</b>	4b	oval, strong central leader, symmetrical branching, good branch angles	orange-red	non-fruiting	glossy leaves
<b>Sparticus®  (‘Sparzam’)</b>	4a	pyramidal form	burgundy with bronze highlights	non-fruiting	glossy dark green foliage, silvery-white undersides, wavy leaf margins, longer foliage retention
<b>Windy City™  (‘Tures’)</b>	4a	oval to rounded, good central leader, may have smaller width, possibly only 30’-35’ wide	burgundy to reddish-orange with orange and yellow highlights	fruiting	semi-glossy foliage, bark resistant to frost cracking



**Scientific Name:** *Fraxinus excelsior* ‘Hessei’

**Common Name:** Hessei European Ash

**Environmental Conditions:**

**Hardiness Zone:** 4b

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** Ashes are susceptible to a number of insect and disease problems, *F. excelsior* is particularly susceptible to borers, ‘Hessei’ has shown good pest resistance compared to species and other Ashes, although almost as susceptible to borers as species if planted in a hot dry site, all *Fraxinus* are very susceptible to Emerald Ash Borer, do not use in midwest or northeast where Emerald Ash Borer exists or is moving toward the region

**Growth Characteristics:**

**Height:** 60’

**Width:** 45’

**Form/Habit:** typically upright oval to rounded, occasionally almost flat-topped at maturity, very vigorous, typically dense

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** seedless

**Seasonal Foliage Color:** lustrous dark green in summer, potentially yellow in fall, although leaves typically remain green late into fall and drop when still green

**Bark:** not ornamentally important, gray to gray-brown

**Transplant Issues:** easy to transplant B&B or ≤ 2” caliper bare root

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** above info is cultivar specific



**Scientific Name:** *Fraxinus pennsylvanica*

**Common Name:** Green Ash

**Environmental Conditions:**

**Hardiness Zone:** 2a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** Ashes are susceptible to a number of insect and disease problems, ash borer (in hot dry environments) may be serious, *F. pennsylvanica* is fairly resistant to ash yellows (a problem for *F. americana* in the Eastern and Midwestern United States), all *Fraxinus* are very susceptible to Emerald Ash Borer, do not use in midwest or northeast where Emerald Ash Borer exists or is moving toward the region

**Growth Characteristics:**

**Height:** 40'-60'

**Width:** 30'-50'

**Form/Habit:** pyramidal in youth, variable with age, oval to rounded and often irregular

**Rate:** fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** not ornamentally important, samara on female trees

**Seasonal Foliage Color:** glossy medium to dark green in summer, typically inconsistent yellow in fall, some of available cultivars turn bronze-red, burgundy, or purple in fall

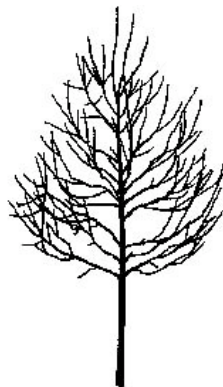
**Bark:** gray to gray-brown, narrow interlacing ridges create diamond shaped furrows

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** may require frequent pruning as storm damage prone, fruit litter can be a problem, non-fruiting cultivars available

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** see chart on following page, selections made for growth form/habit, seedless character of male trees, and foliage characteristics (specifically dark green and shiny leaves in summer and attractive fall color)



'Patmore'

*Fraxinus pennsylvanica* (Green Ash) cultivars:

<b>Common:</b>					
<b>Cultivar</b>	<b>Zone</b>	<b>Form/Habit</b>	<b>Foliage</b>	<b>Fruit</b>	<b>Other</b>
<b>Cimmaron®</b> (‘Cimmzam’)	4	upright-oval, 30’ wide, straight central leader, good branch structure	thick, glossy, dark green in summer, burgundy changing to orange in fall, leafs-out late, holds leaves late	non-fruiting	
‘Marshall’	3a	broadly oval, irregular at times	glossy dark green in summer, bright yellow in fall	usually but not always non-fruiting	fewer insect and disease problems than species
‘Patmore’	3a (2b)	oval to broadly pyramidal, straight trunk, good branch structure, symmetrical	glossy, dark green in summer, long-lasting yellow in fall	non-fruiting	relatively pest free
‘Summit’	3b	upright, oval to pyramidal, 25’-35’ wide straight trunk, good central leader, symmetrical	semi-glossy, excellent golden yellow in fall	light and infrequent crops	thicker bark, more resistant to mechanical damage
<b>Urbanite®</b>	5b	broadly pyramidal to oval	thick, leathery, lustrous dark green in summer, bronze-red in fall	none observed	thicker bark appears more sun -scald resistant
<b>Available</b>					
<b>Cultivar</b>	<b>Zone</b>	<b>Form/Habit</b>	<b>Foliage</b>	<b>Fruit</b>	
‘Bergeson’	3 (2)	upright, oval, dense, rapid grower	lustrous dark green in summer, yellow in fall	non-fruiting	
<b>Centerpoint™</b>	4	broadly oval to rounded, symmetrical	very glossy, yellowish in fall	non-fruiting	
<b>ChampTree™</b> (‘National 1999’)	4	rounded, upright spreading branches	glossy, yellow in fall	non-fruiting	
<b>DakotaCentennial™</b> (‘Wahpeton’)	3	oval to broadly pyramidal, tends to maintain central leader, good branch structure	glossy, bright green changes to dark green in summer, deep yellow in fall	non-fruiting	
<b>Georgia Gem™</b> (‘Oconee’)	6	upright-oval	larger leaves, glossy, dark green in summer, yellowish in fall	non-fruiting	
<b>Newport™</b> (‘Bailey’)	3b	oval, straight trunk, good branching	glossy dark green in summer, yellow in fall	non-fruiting	
<b>Prairie Spire™</b> (‘Rugby’)	3	upright-oval to narrow pyramidal, 20’ wide, dense branching	glossy, bright green changes to dark green in summer, golden yellow in fall	non-fruiting	
<b>Skyward™</b> (‘Wandell’)	5b	narrowly pyramidal, 20’ wide, dense	thick, semi-lustrous, bronze-red to purple in fall	non-fruiting	
<b>var. lanceolata</b>	3	oval to rounded	lanceolate, golden yellow in fall		

**Scientific Name:** *Ginkgo biloba*

**Common Name:** Ginkgo, sometimes called Maidenhair Tree

**Environmental Conditions:**

**Hardiness Zone:** 4b

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** relatively pest free

**Growth Characteristics:**

**Height:** 50'-80' (can reach over 100')

**Width:** greatly variable, 30'-40' is common, potentially wider than high at maturity

**Form/Habit:** variable, irregular when young, pyramidal with age, open, often large wide-spreading branches

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous

**Fruit:** noxious smelling on female trees, specify male trees

**Seasonal Foliage Color:** bright green in summer, yellow in fall

**Bark:** light gray-brown, ridged and furrowed

**Transplant Issues:** difficult to transplant bare root, best planted B&B

**Management Issues:** specify male trees to avoid fruit litter and noxious fruit smell, easy fall clean-up as all leaves drop within just a couple days of each other

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

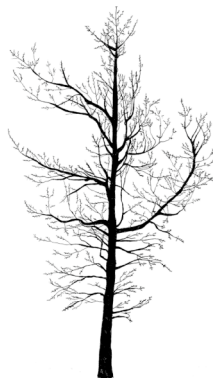
**Cultivars:** all the following cultivars are male (non-fruiting)

**Common:** 'Autumn Gold' (50' high, 35' wide – perhaps broader later, symmetrical when young, broad, excellent golden yellow fall color), 'Lakeview' (45' high, 25' wide, narrowly conical, upright, frequently irregular), 'Magyar' (60' high, 30' wide, narrowly-pyramidal, uniform, upright branching), **Princeton Sentry®** ('PNI 2720', 60' high, 25' wide, narrowly conical, upright, uniform branching)

**Available:** **Golden Colonade™** ('JFS-UGA2', 40' high, 25' wide, narrow oval form, strong central leader), 'Golden Globe' (zone 6, 80' wide, 30'-40' wide, denser branching habit), **Emperor™**

('Woodstock', uniform oval form, strong central leader, good branching habit, good yellow fall color),

**Presidential Gold™** ('The President', 50' high, 40' wide broadly pyramidal to oval, bright yellow fall color, strong central leader and full branching when young), 'Saratoga' (40' high, 30' wide, distinct central leader, somewhat oval, good yellow fall color), **Windover Gold®** (upright oval form, golden fall color, vigorous growth)



**Scientific Name:** *Gleditsia triacanthos* var. *inermis*

**Common Name:** Thornless Common Honeylocust

**Environmental Conditions:**

**Hardiness Zone:** 4b (selected cultivars into 4a and 3b)

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** over-planting has encouraged severe insect problems in many areas, including spider mite borers, leaf spot, cankers, powdery mildew, witches' broom, Honeylocust plant bug ('Moraine' and Skyline® have shown some resistance, green-leaved strains more tolerant such as Shademaster®, yellow-leaved strains very susceptible such as Sunburst®), mimosa webworm ('Moraine' resistant, 'Green Glory' moderately resistant, Imperial® very susceptible), Thyronectria canker (Halka™ resistant, Imperial®, Shademaster®, Skyline®, and Trueshade® partially resistant, 'Morraine', Skyline® and Sunburst® susceptible), and Nectria canker (Sunburst® susceptible)

**Growth Characteristics:**

**Height:** 40'-80'

**Width:** 30'-70'

**Form/Habit:** oval to rounded, open, spreading

**Rate:** fast

**Ornamental Characteristics:**

**Flower:** inconspicuous, not ornamentally important

**Fruit:** long brown pods, most cultivars have little to no fruit

**Seasonal Foliage Color:** light green in summer (dark green cultivars available), yellow in fall

**Bark:** attractive, dark gray-brown, develops scaly platy ridges and deep furrows with age

**Other:** drops leaves early

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** small leaves easy for fall clean-up

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars** (all typically less than 50' high): **Halka™** ('Christie', zone 4a (3b), full branching, develops heavier caliper at an early age, essentially fruitless), **'Moraine'** (zone 3b, denser than species, upper branches ascending, lower branches more pendulous, dark green summer foliage, golden yellow fall color, fruitless form, reportedly susceptible to storm damage), **Shademaster®** ('PNI 2835', zone 3b, high vase shaped canopy, dark green summer foliage, late to turn yellow-green in fall, essentially fruitless), **Skyline®** ('Skycole', zone 3b, upright, broadly pyramidal, strong central leader, tight upright branching, dark green summer foliage, good yellow fall color), **Spectrum™**, ('Speczem', rounded form, foliage has bright golden-yellow tips, essentially fruitless), **True Shade®** (fast growing, shiny dark bark, essentially fruitless)

\*Avoid **'Rubylace'** and **Sunburst®** ('Suncole')



**Scientific Name:** *Gymnocladus dioicus*

**Common Name:** Kentucky Coffeetree

**Environmental Conditions:**

**Hardiness Zone:** 4a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Insect/Disease Factors:** relatively pest free

**Growth Characteristics:**

**Height:** 50'-70'

**Width:** 40'-50'

**Form/Habit:** very sparse branching when young, oval to vase shaped, upward arching branches, open, unique and irregular, coarse yet particularly interesting and picturesque in winter, provides filtered shade in summer, male trees often more upright

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** greenish-white or yellowish-white pyramidal clusters, late spring, 8"-12" on female trees, 3"-4" on male trees, female has rose fragrance

**Fruit:** leathery, reddish-brown to black, 4"-10" long pods in fall, persist throughout winter

**Seasonal Foliage Color:** emerges late spring with pinkish-purplish tinge, changing to blue-green in summer, potentially good yellow in fall

**Bark:** attractive, gray-brown to dark brown, rough, with hard thin and scaly ridges curling outward exposing an orange-brown color

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** use of male tree eliminates fruit litter problem

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** 'Espresso' (male non-fruiting form)



**Scientific Name:** *Liquidambar styraciflua*

**Common Name:** American Sweetgum

**Environmental Conditions:**

**Hardiness Zone:** 5b, northern seed source recommended or reliably cold hardy cultivar

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 7.5

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 50'-75' (80'-120' in the wild)

**Width:** 40'-65'

**Form/Habit:** pyramidal when young, oval to round with age, straight trunk

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important, present as leaves are emerging and expanding

**Fruit:** 1"-1 1/2" ball of dehiscent capsules, persist into winter

**Seasonal Foliage Color:** glossy deep green in summer, great variability in fall, yellow/orange/red/purple tones, typically excellent fall color

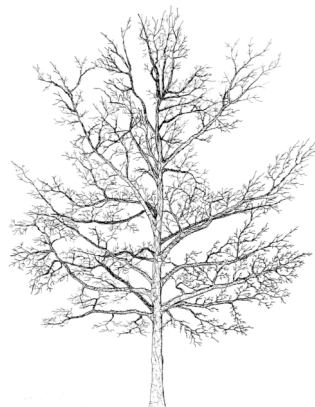
**Bark:** grayish-brown, somewhat rounded ridges and deep furrows

**Transplant Issues:** transplant B&B, not bare root

**Management Issues:** fruit litter may be objectionable

**Suggested Uses:** narrow or wide street tree lawns/pits, parks

**Cultivars:** **Cherokee™** ('Ward', burgundy to red fall color, produces corky bark early, virtually seedless), **Emerald Sentinel®** ('Clydesform', 30' high, 12-15' wide, yellow-orange fall color, slower growing than species), **Gold Dust®** ('Goduzam', reliably cold hardy in zone 5, gold and green variegated, strongly star-shaped leaves, fall color adds pink and burgundy tones), **Grandmaster™** ('Grazam', reliably cold hardy in zone 5, retains pyramidal form with age, star-shaped leaves, orange to reddish-purple fall color), **Happidaze®** ('Hapdel', heavy crown, well spaced branching, deep maroon fall color), **Moraine** (most cold hardy cultivar, reportedly to zone 4b, uniform, upright-oval habit, fast growing, bright red to burgundy fall color), **Rotundiloba** (not as hardy, zone 6 (5b), rounded leaf lobes, fruitless), **Worplesdon** (mixed reports on hardiness, possibly not as hardy, only zone 6, uniquely lobed leaves, apricot-orange or purple fall color)



**Scientific Name:** *Liriodendron tulipifera*  
**Common Name:** Tuliptree or Tulip Poplar  
**Environmental Conditions:**

**Hardiness Zone:** 5a (4b), northern seed source recommended  
**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 8.2

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 70'-90' (can grow 150'+ in wild)

**Width:** 35'-50'

**Form/Habit:** somewhat pyramidal in youth, oval with age

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** tulip shaped, 2" upright, pale green, deep orange at base, late spring to early summer

**Fruit:** cone like cluster of woody samaras

**Seasonal Foliage Color:** bright green in summer, yellow in fall

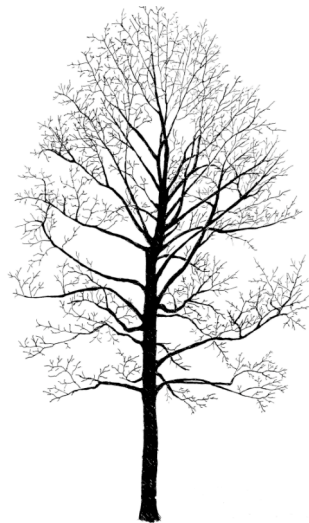
**Bark:** gray to gray-brown, furrowed with tight, lighter colored, interlacing, round to flat ridges

**Transplant Issues:** difficult to transplant B&B or bare root, B&B transplanting in small caliper is best

**Management Issues:** soft bark easily damaged by mechanical injury, leaf yellowing followed by leaf drop can be a real problem if trees do not receive adequate water

**Suggested Uses:** wide street tree lawns/pits or parks due to size and drought sensitivity

**Cultivars:** 'Fastigiatum' or 'Arnold' (narrow form, 50'-60' high, 15'-25' wide)





**Scientific Name:** *Maclura pomifera* var. *inermis* (male)

**Common Name:** Osage Orange

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** relatively pest free

**Growth Characteristics:**

**Height:** 30'-50'

**Width:** 30'-50'

**Form/Habit:** irregular, rounded, typically low branching, stiff interlacing branches, sometimes branches show pendulous tendency

**Rate:** fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** baseball size green-yellow fruit on female trees in fall

**Seasonal Foliage Color:** bright, glossy medium to dark green in summer, yellow-green to good yellow in fall

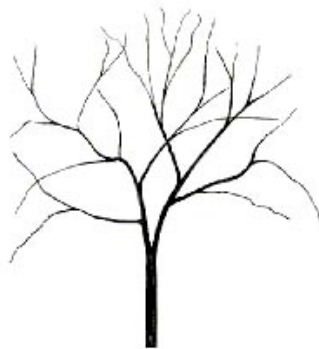
**Bark:** attractive, orange-brown inner bark seen though shredding gray-brown outer bark

**Transplant Issues:** easy to transplant B&B

**Management Issues:** use of male tree eliminates fruit litter problem, var. *inermis* is completely thornless (except for juvenile stems, which occasionally have thorns)

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™, useful as a windbreak

**Cultivars:** 'Wichita' (thornless male, upright-spreading habit), 'Whiteshield' (thornless male, upright oval form) availability of any cultivar may be limited



**Scientific Name:** *Metasequoia glyptostroboides*

**Common Name:** Dawn Redwood

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET			VERY DRY									
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil			
1	2	3	4	5	6	7	8	9	10	11	12	

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Insect/Disease Factors:** none serious or limiting, although mites can cause defoliation under drought stress

**Growth Characteristics:**

**Height:** 70'-100'

**Width:** 25'-50'

**Form/Habit:** pyramidal, single straight trunk, tapered with a buttressed base, develops an irregular fluted character and armpit-like depressions below the branch attachments to central leader

**Rate:** fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** 1" pendulous cones

**Seasonal Foliage Color:** bright green in summer, brown in fall, often pinkish/orange-brown to red-brown

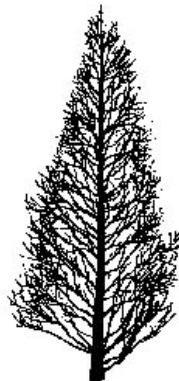
**Bark:** reddish brown, fissured, finely shredding and exfoliating

**Transplant Issues:** easy to transplant B&B

**Management Issues:** lower branch attachments would require removal for typical street tree use

**Suggested Uses:** exceptionally wide street tree lawns/pits with pruning or parks due to size, low branching, and drought sensitivity

**Cultivars:** formerly limited availability of both cultivars, current availability unknown, 'National' and 'Sheridan Spire' were selected for narrow growth habits, 'Sheridan Spire' is likely more upright, compact and columnar growing than 'National', 'National' may be more susceptible to canker problems than species



**Scientific Name:** *Nyssa sylvatica*

**Common Name:** Black Tupelo, also known as Sour Gum or Black Gum

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:**  $\leq 7.5$

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 30' - 60' (although rare, can grow to 100'+)

**Width:** 20' - 40'

**Form/Habit:** pyramidal when young, dense, horizontal branching, sometimes pendulous lower branches, varies with age between two distinct forms, either an irregular-rounded and often flat-topped form or an oval to pyramidal form

**Rate:** slow to medium

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** not ornamentally important, fairly inconspicuous, 1/2" long blue-black drupes in pairs or clusters, eaten by birds and mammals

**Seasonal Foliage Color:** glossy green in summer, great variability in fall (yellow/orange/red/purple tones), typically excellent fall color

**Bark:** color variable, dark gray to brown, often silvery or almost black, texture variable, at times irregular ridges broken into short segments, other times almost scaly

**Transplant Issues:** difficult to transplant, use small caliper B&B only, slow to recover from transplanting

**Management Issues:** fruits (found on older trees) can stain sidewalk and may cause litter problem

**Suggested Uses:** narrow or wide street tree lawns/pits, parks

**Cultivars:** strongly weeping form 'Autumn Cascades' is available but not suitable for street tree use



**Scientific Name:** *Ostrya virginiana*

**Common Name:** American Hophornbeam (also known as Ironwood, but should not be confused with *Carpinus caroliniana*, which is more commonly called Ironwood)

**Environmental Conditions:**

**Hardiness Zone:** 3b

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** very sensitive

**pH:**  $\leq 8.2$

**Insect/Disease Factors:** none serious or limiting if healthy, two-lined chestnut borer can destroy stressed trees

**Growth Characteristics:**

**Height:** 30'-50'

**Width:** 20'-30'

**Form/Habit:** oval to pyramidal in youth, oval to rounded with age, horizontal and drooping branching, should specify single-stem form as multi-stem form is available

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** female visible in spring, but not showy, male visible in winter, 1" long catkins in clusters

**Fruit:** small, greenish-white, inflated pods in tight hanging clusters (hop-like, hence the common name)

**Seasonal Foliage Color:** dark green in summer, yellow in fall

**Bark:** attractive, light grayish brown, shredded look

**Transplant Issues:** difficult to transplant B&B or bare root, slow to recover from transplanting

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks

**Cultivars:** none known



**Scientific Name:** *Phellodendron amurense*

**Common Name:** Amur Corktree

**Environmental Conditions:**

**Hardiness Zone:** 4b (3b)

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Insect/Disease Factors:** relatively pest free

**Growth Characteristics:**

**Height:** 30'-45'

**Width:** 30'-40'

**Form/Habit:** broadly vase-shaped to rounded, open with massive branches, often horizontally arranged, shorter trunk common

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous

**Fruit:** not ornamentally important, small, black

**Seasonal Foliage Color:** often glossy dark green in summer, yellow to bronzy-yellow in fall

**Bark:** attractive, light gray-brown, corky, furrowed

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** fruit on female trees may be a litter problem and can stain sidewalks, may naturalize when planted next to open areas, use male cultivar to avoid both potential problems

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** 'His Majesty' (*P. sachalinense* x *P. amurense*, zone 3, male, fruitless, broadly vase-shaped, fast growing, yellow fall color), **Eye Stopper™** ('Long Necker', actually *P. lavalleyi* cultivar selected for bright yellow fall color, *P. lavalleyi* has a higher height at maturity, more upright branching, duller green leaves, and slightly less corky bark than *P. amurense*), **Macho®** (vigorous male, fruitless, broadly vase-shaped, thick leathery leaves, yellow fall color), **Shademaster®** ('PNI 4551', sometimes listed as zone 3, male, fruitless, good branching structure, glossy foliage, yellow fall color), **Superfection™** ('Supzam', male, fruitless, upright-uniform branching habit)



**Scientific Name:** *Platanus x acerifolia*

**Common Name:** London Planetree

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** over planting has encouraged disease and insect problems, of those cankerstain, anthracnose (hybrid shows considerable variation in resistance, ‘Columbia’ & ‘Liberty’ resistant to eastern strains, ‘Bloodgood’ moderately resistant to eastern strains, **Metroshade™** reportedly resistant to eastern strains as are **Ovation™** and **Exclamation!™**, and ‘Yardwood’ is likely resistant to eastern strains) and powdery mildew (‘Yardwood’ resistant, **Metroshade™** reportedly resistant, conflicting reports on ‘Columbia’, ‘Liberty’, and ‘Bloodgood’) are common

**Growth Characteristics:**

**Height:** 70’-100’

**Width:** 65’-80’

**Form/Habit:** pyramidal when young, open and spreading with age, develops massive branches

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** 1” globe-shaped (syncarp), pendulous, on long stalks, mostly in pairs, persist into winter

**Seasonal Foliage Color:** medium to dark green in summer, yellow-brown in fall

**Bark:** extremely showy, mottled with cream, olive, and light brown colors

**Transplant Issues:** easy to transplant B&B or ≤ 2” caliper bare root

**Management Issues:** frost cracking is common, roots will heave sidewalks, bark/leaf/fruit litter may be a nuisance

**Suggested Uses:** wide street tree lawns/pits or parks due to size, suitable for CU-Structural Soil™

**Cultivars:** ‘Bloodgood’ (tolerates severe pruning, fast growing), ‘Columbia’ (zone 6, more deeply lobed leaves), **Exclamation!™** (‘Morton Circle’, zone 4, uniform habit, conical in youth, dense growth, light fruiting), ‘Liberty’, **Metroshade™** (‘Metzam’, cinnamon colored new growth), **Ovation™** (‘Morton Euclid’, Zone 4, fast growing, uniform habit), ‘Yarwood’ (possibly not as hardy, reportedly only into zone 6, fast growing, bark exfoliates at younger age)



**'Bloodgood'**

**Scientific Name:** *Prunus sargentii*

**Common Name:** Sargent Cherry

**Environmental Conditions:**

**Hardiness Zone:** 4b (5a for reliable flowering)

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:**  $\leq 7.5$

**Insect/Disease Factors:** none incapacitating

**Growth Characteristics:**

**Height:** 40'-50'

**Width:** 20'-30', equal to height possible

**Form/Habit:** vase-shaped to rounded

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** showy, pink, early spring before leaves, hardy buds

**Fruit:** small, purple-black cherries, summer, not showy

**Seasonal Foliage Color:** emerges with reddish tinge in spring, glossy dark green in summer, yellow to bronze-red in fall

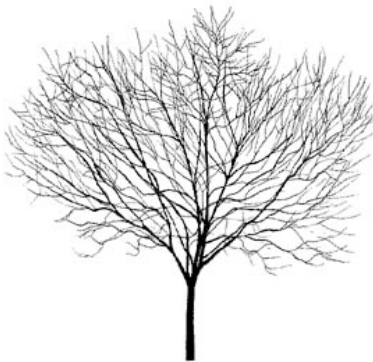
**Bark:** attractive, polished mahogany-red color

**Transplant Issues:** easy to transplant B&B or  $\leq 2$ " caliper bare root

**Management Issues:** cherries are short-lived trees (only 50 years in good site), fruit could stain sidewalk and be a nuisance in some situations

**Suggested Uses:** narrow or wide street tree lawns/pits, parks

**Cultivars:** 'Columnaris' (not true columnar, just narrower form with definite upright branching, 10'-20' wide, likely shorter, 30'-40' high, often flowers slightly later than species with emerging leaves instead of before leaves), **Pink Flair** ('JFS-KW58', zone 4a, may be hardy to zone 3, 25' high, 15' wide, upright narrow vase form, flowers a week or two later than typical species, consistent orange-red fall color)



**Scientific Name:** *Pyrus calleryana*

**Common Name:** Callery Pear

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** susceptible to fireblight, see cultivars for resistance

**Growth Characteristics:**

**Height:** 30'-50'

**Width:** 20'-40'

**Form/Habit:** pyramidal in youth, broadens with age to oval or rounded, dense branching and foliage

**Rate:** fast

**Ornamental Characteristics:**

**Flower:** showy, white clusters, spring before or as leaves emerge

**Fruit:** ½" greenish to tan, in clusters

**Seasonal Foliage Color:** glossy dark green in summer, fall color variable (yellow/orange/red/purple) but usually excellent

**Bark:** brown, lightly ridged and furrowed with age, sometimes grayish and blocky with age as well

**Other:** holds leaves late

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** branching angles and branch density combined with late holding leaves may make species prone to early winter ice/snow storm damage, cultivar 'Bradford' is no longer recommended because of tendency for severe limb breakage, newer cultivars with improved branching habits are available, graft incompatibility can be a problem

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** see chart on following page, selections made for growth form, improved branching habit, flowering, fall color, and disease resistance, see small tree section for *Pyrus* under 30'



**'Autumn Blaze'**



*Pyrus calleryana* (Callery Pear) cultivars:

Cultivar	Zone	Form/Habit	Fall Foliage	Disease Resistance	Other
<b>Aristocrat®</b>	5a	broadly pyramidal, wider branch angles, more open	variable, yellow to deep red	slightly fireblight susceptible	later bloomer, sparser flowering, but still showy, wavy leaf margins
<b>‘Autumn Blaze’</b>	5a (4b)	rounded, can be irregular, more open, wider branch angles	early, reliable red	fireblight susceptible	leaves emerge with red tint in spring, drops leaves earlier
<b>Burgundy Snow™</b> (‘Bursnozam’)	4	pyramidal			burgundy flower centers, heavy flowering, leaves are not dark green
<b>‘Cambridge’</b>	4	upright, narrow-pyramidal, 15’ wide	bright orange		
<b>‘Capital’</b>	5b (5a)	columnar, central leader, 15’ wide, more upright than ‘Whitehouse’	copper-red to red-purple	slightly fireblight susceptible	very glossy leaves
<b>Chanticleer®</b> (‘Glens’ Form’) same as ‘Cleveland Select’ same as ‘Stonehill’	5a (4b)	upright, narrow-pyramidal, 15’-20’ wide, multiple leaders common, even branching	gold-red to plum	fireblight tolerant	heavier and later (a week) flowering, enters dormancy earlier
<b>‘Fauriei’</b> sometimes listed as <i>P. calleryana</i> var. <i>fauriei</i> or <i>P. fauriei</i>	5a	pyramidal to rounded, wider branch angles, slower growing	early, variable	fireblight tolerant	heavy flowering, leaves leathery, drops leaves earlier
<b>Gladiator™</b> (‘Glazam’)	4	pyramidal, strong central leader, fast growing	likely variable		
<b>New Bradford®</b> (‘Holmford’)	5	broadly oval to rounded	yellow to orange-red		
<b>‘Redspire’</b>	5a	pyramidal to oval, dense, symmetrical, slower growing	often poor in north, variable	fireblight tolerant	heavy flowering, enters dormancy earlier, thick leaves
<b>‘Trinity’</b>	5b (5a)	broadly oval to rounded	consistent, orange-red		heavy flowering, light green leaves
<b>Valiant®</b> (‘Valzam’)	4	upright pyramidal, 15-20 wide	crimson-red		
<b>‘Whitehouse’</b>	5b (5a)	narrow pyramidal, 15’-20’ wide, strong central leader	early, reddish purple	slightly fireblight susceptible, highly leaf-spot susceptible	leaves held late

**Scientific Name:** *Quercus acutissima*

**Common Name:** Sawtooth Oak

**Environmental Conditions:**

**Hardiness Zone:** 5b or 6a

**Soil Moisture:**

VERY WET													VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil						
1	2	3	4	5	6	7	8	9	10	11	12				

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:**  $\leq 7.5$

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 40'-50'

**Width:** 35'-55'

**Form/Habit:** broadly pyramidal in youth, oval-rounded to broad-rounded with age, dense

**Rate:** medium (fast for an Oak)

**Ornamental Characteristics:**

**Flower:** attractive, pendent, golden, 3-4" male catkins, early spring as leaves emerge

**Fruit:** acorn, often heavy crops on older trees

**Seasonal Foliage Color:** leaves emerge yellow to light green in spring, lustrous green in summer, yellow to golden brown in fall, late to turn color in fall

**Bark:** attractive, gray-brown, deeply ridged and furrowed, almost corky on older trunks

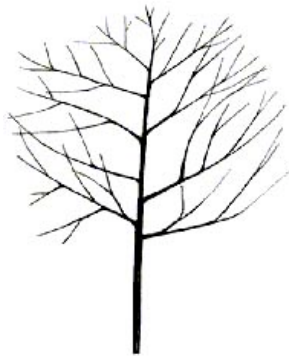
**Other:** young trees hold leaves throughout winter

**Transplant Issues:** transplant B&B

**Management Issues:** acorns on older trees may be a litter problem certain years

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** 'Gobbler' is the name given to seedlings that produce early and abundant acorns for wild turkey food, extremely limited availability



**Scientific Name:** *Quercus bicolor*  
**Common Name:** Swamp White Oak  
**Environmental Conditions:**

**Hardiness Zone:** 4a  
**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 7.5 (variable susceptibility to iron chlorosis in high pH soils)

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 50'-60'

**Width:** 50'-60'

**Form/Habit:** broad, rounded, open, typically has shorter trunk

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** catkins, spring

**Fruit:** acorn, heavy crops at 3-5 year intervals

**Seasonal Foliage Color:** lustrous, leathery, dark green in summer (if soil has appropriate pH), yellowish in fall, sometimes red-purple in fall

**Bark:** attractive, grayish brown, flaky and divided into deep longitudinal fissures with flat ridges

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** acorns may be a litter problem certain years

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** **Regal Prince®** ('Long', *Q. robur* x *Q. bicolor*, zone 4, columnar to narrow oval habit, 20' wide, glossy bright green summer foliage, yellow fall color, highly mildew resistant), **Rosehill®** ('Asjes', *Q. robur* x *Q. bicolor*, zone 4, narrow oval habit, 20' wide, glossy pure green summer foliage, yellow fall color, good mildew resistance)



**Scientific Name:** *Quercus coccinea*

**Common Name:** Scarlet Oak

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:**  $\leq 7.5$

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 60'-70' (can reach 100'+ in wild)

**Width:** 40'-50'

**Form/Habit:** round, open

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** catkins, spring as leaves emerge

**Fruit:** acorn

**Seasonal Foliage Color:** glossy dark green in summer, russet-red to brilliant scarlet in fall, late to turn color in fall

**Bark:** gray-brown

**Other:** leaves persist throughout winter, particularly on young trees

**Transplant Issues:** difficult to transplant B&B or bare root

**Management Issues:** acorns may be a litter problem certain years

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** none available

**Scientific Name:** *Quercus imbricaria*

**Common Name:** Shingle Oak

**Environmental Conditions:**

**Hardiness Zone:** 5a (4b if hardy parent material selected)

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:**  $\leq 7.5$

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 40'-60' (can grow 80'-100')

**Width:** 40'-65'

**Form/Habit:** pyramidal to upright-oval in youth, broad-rounded outline with age, often lower lateral branches droop

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** pale yellow-green catkins, spring as leaves emerge

**Fruit:** acorn

**Seasonal Foliage Color:** leaves unfold reddish in spring, lustrous dark green in summer, yellow-brown to russet-red in fall

**Bark:** gray-brown, shallow furrows, close low ridges that broaden with age

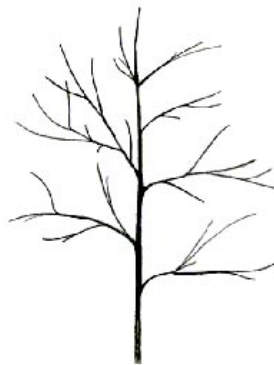
**Other:** leaves persist throughout winter

**Transplant Issues:** difficult to transplant B&B or bare root, slow to recover from transplanting

**Management Issues:** acorns may be a litter problem certain years although reportedly less of a litter problem than with other oaks, accepts pruning well

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** none known



**Scientific Name:** *Quercus macrocarpa*  
**Common Name:** Bur Oak or Mossycup Oak  
**Environmental Conditions:**

**Hardiness Zone:** 3a  
**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 60'-80' (can grow 100'+)

**Width:** 60'-90', typically equal or slightly greater than height

**Form/Habit:** weakly pyramidal to oval in youth, broadly rounded and open with age

**Rate:** slow

**Ornamental Characteristics:**

**Flower:** pale yellowish catkins, spring as leaves emerge

**Fruit:** acorn, heavy crops at 3-5 year intervals

**Seasonal Foliage Color:** leathery, lustrous dark green in summer, yellow-green to yellow-brown in fall

**Bark:** dark gray to gray-brown, rough, corky, thick, developing deep ridges and furrows

**Transplant Issues:** difficult to transplant B&B or bare root, transplant small caliper trees

**Management Issues:** acorns may be a litter problem certain years

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size, suitable for CU-Structural Soil™

**Cultivars:** none known



**Scientific Name:** *Quercus muehlenbergii*

**Common Name:** Chinkapin Oak, sometimes called Yellow Chestnut Oak

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:**  $\leq 8.2$

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 30'-50'

**Width:** 30'-60', usually greater than height at maturity

**Form/Habit:** round

**Rate:** medium in youth, slow with age

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous

**Fruit:** acorn

**Seasonal Foliage Color:** lustrous dark yellow-green in summer, yellow to orange-brown to brown in fall

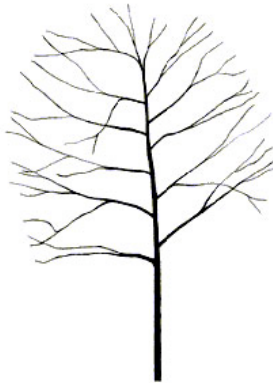
**Bark:** gray, rough and flaky

**Transplant Issues:** difficult to transplant B&B or bare root, only transplant B&B

**Management Issues:** acorns may be a litter problem certain years

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size, suitable for CU-Structural Soil™

**Cultivars:** none known



**Scientific Name:** *Quercus palustris*

**Common Name:** Pin Oak

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 7.0 (iron chlorosis in high pH soils)

**Insect/Disease Factors:** over planting has encouraged problems, including gypsy moth, oak wilt, galls, and cankers, resistant to anthracnose

**Growth Characteristics:**

**Height:** 50'-70' (can reach 100'+)

**Width:** 40'-50'

**Form/Habit:** pyramidal in youth, oval with age, strong central leader, distinct branching habit – upper branches upright, middle branches horizontal, and lower branches descending

**Rate:** fast for an oak

**Ornamental Characteristics:**

**Flower:** pale yellow-green catkins, spring as leaves emerge

**Fruit:** acorns

**Seasonal Foliage Color:** glossy dark green (if soil has appropriate pH) in summer, scarlet in fall

**Bark:** gray-brown, thinner, smooth, develops narrow ridges and shallow furrows with age

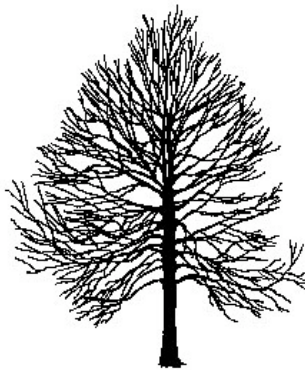
**Other:** young trees hold leaves throughout winter

**Transplant Issues:** only transplant B&B, moderately difficult to transplant bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2" caliper trees bare root

**Management Issues:** acorns may be a litter problem certain years, descending lower branches may need pruning where clearance is needed

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** none known





**Scientific Name:** *Quercus phellos*

**Common Name:** Willow Oak

**Environmental Conditions:**

**Hardiness Zone:** 6a

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** unknown

**pH:**  $\leq 7.5$  (iron chlorosis in high pH soils)

**Other:** specify northern seed source if needed

**Insect/Disease Factors:** susceptible to trunk borers, scale, and oak wilt, although rarely serious or limiting, resistant to anthracnose

**Growth Characteristics:**

**Height:** 40'-60' (can reach 100'+ in ideal conditions)

**Width:** 30'-60'

**Form/Habit:** pyramidal in youth, oval to round with age, dense crown, lower branches sometimes descending/pendulous

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** pale yellow-green catkins, spring as leaves emerge

**Fruit:** acorn, small

**Seasonal Foliage Color:** light green in spring, dark green in summer (if soil has appropriate pH), color variable in fall (brown, yellow, bronze-orange, russet-red)

**Bark:** gray-brown, becoming lightly ridged and furrowed with age

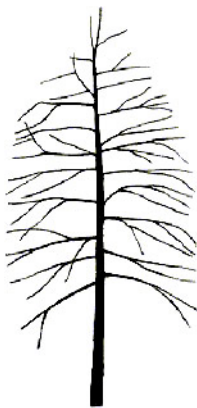
**Other:** leaves persist throughout winter

**Transplant Issues:** best transplanted B&B

**Management Issues:** acorns may be a litter problem certain years, descending/pendulous lower branches may require removal where clearance is needed

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** none known



**Scientific Name:** *Quercus robur*

**Common Name:** English Oak

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** powdery mildew is a serious problem, **Attention!**, **Crimson Spire™**, **Regal Prince®**, **Rosehill®**, **Skymaster™**, and **Skyrocket™** show varying levels of resistance

**Growth Characteristics:**

**Height:** 40'-60' (can reach 75'-100'+)

**Width:** 40'-60'

**Form/Habit:** broadly rounded, open

**Rate:** slow to medium

**Ornamental Characteristics:**

**Flower:** pale yellow-green catkins, spring as leaves emerge

**Fruit:** acorn

**Seasonal Foliage Color:** dark green to blue-green in summer, brown in fall

**Bark:** grayish black, deeply furrowed

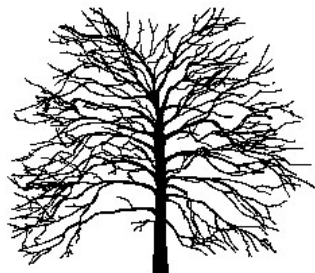
**Transplant Issues:** moderately difficult to transplant bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2" caliper trees bare root, best transplanted B&B

**Management Issues:** acorns may be a litter problem certain years

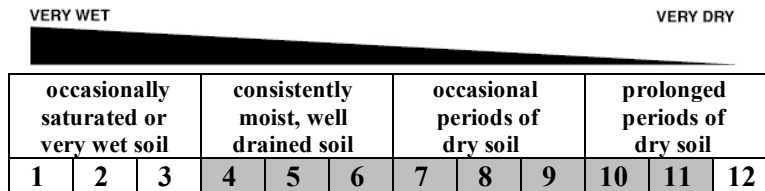
**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size, suitable for CU-Structural Soil™

**Cultivars:** **Attention!** ('DTR 105', columnar form, dense, 15' wide, dark green foliage, bronze fall color, good mildew resistance), **Crimson Spire™** ('Crimschmidt', *Q. alba* x *Q. robur*, columnar form, 15' wide, faster growing, dark green mildew resistant foliage, reddish fall color), **Regal Prince®** ('Long', *Q. robur* x *Q. bicolor*, zone 4, columnar to narrow oval habit, 20' wide, glossy bright green summer foliage, yellow fall color, highly mildew resistant), **Rosehill®** ('Asjes', *Q. robur* x *Q. bicolor*, zone 4, narrow oval habit, 20' wide, glossy pure green summer foliage, yellow fall color, good mildew resistance), **Skymaster™** ('Pyramich', narrow when young, pyramidal with age, 25'-30' wide, strong central leader, good branching angles, reportedly mildew resistant), **Skyrocket™** (uniform columnar habit, 15' wide, leafs out early, yellow-brown fall color, reportedly moderately mildew resistant)

\* '**Fastigiata**' (columnar form, 15'-20' wide, not recommended due to variability from seed propagation, resulting in potential iron chlorosis in high pH soils and powdery mildew susceptibility)



**Scientific Name:** *Quercus rubra*  
**Common Name:** Northern Red Oak  
**Environmental Conditions:**  
**Hardiness Zone:** 3b  
**Soil Moisture:**



**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 7.5

**Insect/Disease Factors:** oak wilt is a serious problem in more southern areas, resistant to anthracnose

**Growth Characteristics:**

**Height:** 60'-80' (can grow 90'-100' in wild)

**Width:** 50'-70'

**Form/Habit:** round

**Rate:** fast for an oak

**Ornamental Characteristics:**

**Flower:** catkins, spring

**Fruit:** acorn, heavy crops at 3-5 year intervals

**Seasonal Foliage Color:** emerge reddish in spring, lustrous dark green in summer, russet-red to bright red in fall, sometimes disappoints with only yellow-brown fall color

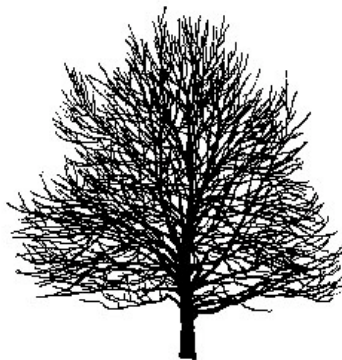
**Bark:** gray, nearly black with age, wide flat-topped silver-gray ridges, separated by shallow fissures, deeply ridged and furrowed on older trunks

**Transplant Issues:** only transplant B&B, moderately difficult to transplant bare root

**Management Issues:** acorns may be a litter problem certain years

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** none available



**Scientific Name:** *Quercus shumardii*

**Common Name:** Shumard Oak

**Environmental Conditions:**

**Hardiness Zone:** 5b or 6a

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** unknown

**pH:**  $\leq 8.2$

**Insect/Disease Factors:** seldom serious or limiting

**Growth Characteristics:**

**Height:** 60'-80' (can reach 100'+ in wild)

**Width:** 45'-65'

**Form/Habit:** pyramidal in youth, oval to round with age

**Rate:** slow to medium

**Ornamental Characteristics:**

**Flower:** pale yellow-green catkins as leaves emerge

**Fruit:** acorn

**Seasonal Foliage Color:** dark green in summer, yellow-bronze possible in fall, russet-red in fall typical

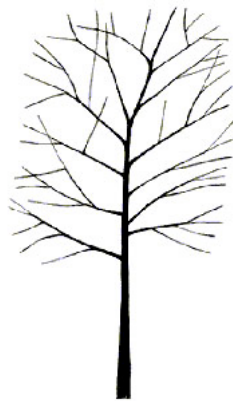
**Bark:** gray-brown, developing somewhat platy ridges and furrows with age

**Transplant Issues:** moderately difficult to transplant B&B, best to transplant B&B

**Management Issues:** acorns may be a litter problem certain years, best to prune in late summer or fall due to "bleeding" in spring

**Suggested Uses:** wide street tree lawns/pits or parks preferred due to size

**Cultivars:** none available



**Scientific Name:** *Robinia pseudoacacia*

**Common Name:** Black Locust

**Environmental Conditions:**

**Hardiness Zone:** 4b

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** prefers full sun, tolerates full shade

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** borers can be a serious problem, leaf miners may also be problematic

**Growth Characteristics:**

**Height:** 40'-50' common, can grow 70'-80'

**Width:** 20'-35'

**Form/Habit:** open, irregular-oval, upright branching

**Rate:** fast

**Ornamental Characteristics:**

**Flower:** pendulous, white, 4"-8" long clusters, late spring, fragrant

**Fruit:** brown-black, flat, 2"-4" long pod, may persist into winter

**Seasonal Foliage Color:** dull blue-green in summer, yellow-green in fall

**Bark:** dark gray, with interlacing ridges, ropy appearance

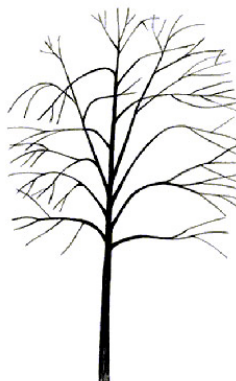
**Transplant Issues:** easy to transplant B&B, '**Pyramidalis**' (although cultivar not recommended) and '**Purple Robe**' are easy to transplant ≤ 2" caliper bare root

**Management Issues:** fruit litter could be problematic, as well as thorns, in certain locations

**Suggested Uses:** narrow or wide street tree lawns/pits (widely used as street tree in Europe), parks, suitable for CU-Structural Soil™, good in very difficult reclamation sites (fixes own nitrogen)

**Cultivars:** '**Frisia**' (spines are red on young shoots, yellow foliage in summer, does not retain yellow color as well in cooler climates), '**Globe**' and '**Bessoniana**' are cultivars under 30' tall, see the small tree section for information on these cultivars

\* '**Pyramidalis**' (sometimes called '**Fastigiata**', narrower, columnar form, spineless, sparse flowering) is not recommended as it is not as hardy as species and is subject to dieback



**Scientific Name:** *Sorbus alnifolia*

**Common Name:** Korean Mountainash

**Environmental Conditions:**

**Hardiness Zone:** 4b

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** prefers full sun, tolerates partial shade

**Salt:** unknown

**pH:**  $\leq 8.2$

**Insect/Disease Factors:** *Sorbus* have potentially many minor pest problems and two major problems – fireblight and borers (borers are particularly problematic if tree is stressed or weakened), *S. alnifolia* is considered the least susceptible to borer injury but is reportedly slightly susceptible to fireblight

**Growth Characteristics:**

**Height:** 30'-40' (can grow 50'-60', although rarely)

**Width:** 20'-30', can reach equal to height

**Form/Habit:** pyramidal in youth, oval to rounded with age

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** showy, white loose clusters, late spring, heavy flowering alternate years

**Fruit:** pink-red to orange-red berries in loose clusters, fall, persistent

**Seasonal Foliage Color:** lustrous dark green in summer, yellow to orange in fall

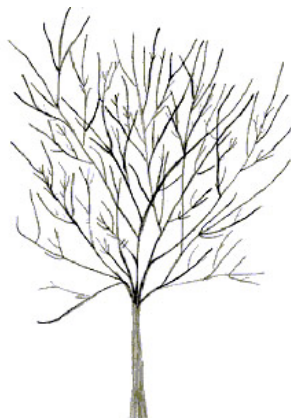
**Bark:** smooth silvery gray

**Transplant Issues:** easy to transplant B&B or  $\leq 2$ " caliper bare root

**Management Issues:** harder wooded than other *Sorbus*, hence storm damage less likely

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** none available



**Scientific Name:** *Styphnolobium japonicum* (*Sophora japonica*)

**Common Name:** Japanese Pagodatree or Scholar-tree

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** twig die-back and stem canker common in colder zones, although not considered serious and are rarely limiting, **Millstone™** less susceptible to stem canker than species, **Regent®** and 'Princeton Upright' resistant to leafhoppers

**Growth Characteristics:**

**Height:** 40'-60'

**Width:** 35'-55'

**Form/Habit:** oval to round, upright spreading branches

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** showy, creamy white, 6"-12" long clusters, summer

**Fruit:** bright green changing to yellow-brown pods in clusters, may persist through winter

**Seasonal Foliage Color:** lustrous bright green in summer, yellowish in fall, late to turn color in fall

**Bark:** grayish brown, furrowed with age, green bark on young branches (1-5 year old wood)

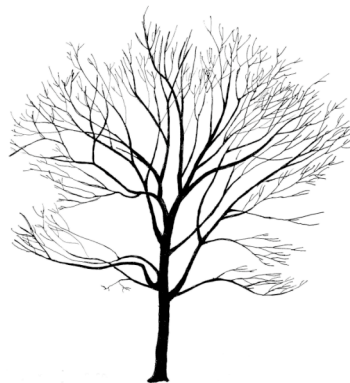
**Transplant Issues:** easy to transplant B&B

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** **Millstone™** ('Halka', good form, symmetrical, uniform, dense branching, deeper green foliage), 'Princeton Upright' (similar to 'Regent' except narrower, upright form, 25'-35' wide),

**Regent®** (fast growing, reportedly straighter trunk, flowers at younger age than species, deeper green foliage, resistance to leaf-chewing insects)



**Scientific Name:** *Taxodium distichum*

**Common Name:** Common Baldcypress

**Environmental Conditions:**

**Hardiness Zone:** 5a (4 with appropriate selection of genetic material)

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:**  $\leq 7.5$

**Insect/Disease Factors:** none serious or limiting, ‘Shawnee Brave’ has mite resistant foliage

**Growth Characteristics:**

**Height:** 50’-70’

**Width:** 20’-40’

**Form/Habit:** columnar when young, slender pyramidal with age, horizontal branching, often with pendulous branchlets, straight tapered trunk is very short and buttressed at base

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** not ornamentally important

**Fruit:** 1” globose cones, green to purple when young, brown at maturity

**Seasonal Foliage Color:** late to leaf out, bright light green in spring, soft green in summer, orange-brown to russet-brown in fall

**Bark:** attractive, reddish-brown and gray-brown, fibrous

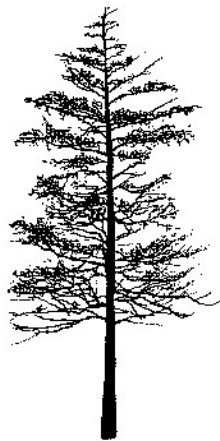
**Transplant Issues:** difficult to transplant B&B or bare root, slow to recover from transplanting

**Management Issues:** none of significance

**Suggested Uses:** wide street tree lawns/pits with pruning or parks due to size, form and low branching habit

**Cultivars:** limited availability, ‘Shawnee Brave’ (zone 5b, narrower, mite resistant foliage, reportedly tolerates high pH soils), ‘Monarch of Illinois’ (wider-spreading)

**Related Species:** *Taxodium ascendens*, Pondcypress, zone 5b, 50’-60’ high, 10’-15’ wide, upright columnar habit





**Scientific Name:** *Tilia americana*

**Common Name:** Basswood

**Environmental Conditions:**

**Hardiness Zone:** 3a

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 8.2

**Insect/Disease Factors:** various pests are potentially problematic, although most are rarely serious, foliage feeding insects can damage and almost completely defoliate, scales and linden mites can be serious, susceptible to Japanese beetles

**Growth Characteristics:**

**Height:** 60'-80', can grow 100'+

**Width:** 30'-60'

**Form/Habit:** pyramidal in youth, oval to rounded with age

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** light yellow, drooping clusters attached to pale greenish-yellow leaf-like bracts, early to mid-summer, very fragrant, attracts bees, flowers before *T. cordata* and *T. tomentosa*

**Fruit:** not ornamentally important, small nutlets, globose, attached to bracts, late summer

**Seasonal Foliage Color:** dark green in summer, green-yellow to pale yellow in fall (if any color), can develop unattractive brownish cast in early fall (late season discoloration)

**Bark:** not ornamentally important, gray to brown with narrow, flat-topped ridges, very tough and fibrous

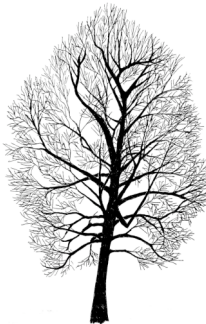
**Other:** buds and twigs have potential winter interest, as they vary in color from brown to reddish to greenish and every combination of those colors

**Transplant Issues:** easy to transplant B&B

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** **American Sentry®** ('McKSentry', uniform pyramidal symmetrical habit), **'Boulevard'** (narrow pyramidal, yellow fall color), **'Fastigiata'** or **'Pyramidal'** (columnar in youth, pyramidal with age, reaching 25' wide, may be slightly shorter, 50' high, ascending branches, dark green foliage, availability may be limited), **Legend®** ('DTR 123', zone 4, also listed to zone 2, broadly pyramidal, good central leader and branch structure, thick dark green leaves resistant to late season discoloration, red stem and bud color), **'Lincoln'** (slender, upright, compact form, yellow fall color, listed as having lighter green foliage, also listed as having dark green foliage), **'Redmond'** (*T. americana* x *T. euchlora*, densely pyramidal, larger leaves, buds/stems/foliage all resemble *T. americana* rather than *T. euchlora*, buds reddish, stems are red-green-brown mix, sometimes listed as having lighter green foliage)



**Scientific Name:** *Tilia cordata*  
**Common Name:** Littleleaf Linden  
**Environmental Conditions:**  
**Hardiness Zone:** 3b  
**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

\*prolonged drought will lead to leaf scorch

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 8.2

**Insect/Disease Factors:** various pests are potentially problematic for *Tilia*, although most are rarely serious, aphids (highly susceptible) and Japanese beetles (especially **Greenspire®**) can be serious problems for *T. cordata*

**Growth Characteristics:**

**Height:** 50'-70'

**Width:** 30'-50'

**Form/Habit:** pyramidal in youth, upright-oval to pyramidal-rounded with age, dense, some cultivars available in multi-stem form (**GreenSpire®**)

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** yellowish, drooping clusters attached to pale greenish-yellow leaf-like bracts, mid-summer, very fragrant, attracts bees, flowers after *T. americana* but before *T. tomentosa*

**Fruit:** not ornamentally important, small nutlets, globose, attached to bracts, late summer

**Seasonal Foliage Color:** dark shiny green in summer, yellow-green to yellow in fall

**Bark:** not ornamentally important, gray-brown, ridged and furrowed on older trunks

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** many are known, the following are more readily available selections

**Chancellor®** ('**Chancole**', fast growing, narrow in youth, becoming tightly pyramidal with age, 20'-30' wide, symmetrical, upward branching, good branch angles, straight trunk, dense, gold-yellow fall color),

**Corinthian®** ('**Corzam**', pyramidal, compact, 15'-25' wide, straight central leader, uniform limb spacing, straight trunk, foliage smaller, thicker, glossier, and reportedly more blue-green), '**Glenleven**'

(reportedly very cold hardy, fast growing, pyramidal to narrow-oval, straight trunk, symmetrical branching, larger leaves, less dense than some other cultivars), **Greenspire®** ('**PNI 6025**', zone 4, pyramidal to broad-oval, strong central leader, symmetrical branching habit), **Shamrock®** ('**Baileyi**', zone 4, broadly pyramidal, more vigorous and more open habit than Greenspire®, symmetrical branching at an early age)



'Glenleven'

**Scientific Name:** *Tilia x euchlora* (*T. cordata* x *T. dasystyla*)

**Common Name:** Crimean Linden

**Environmental Conditions:**

**Hardiness Zone:** 4

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

\*reportedly more drought resistant than *T. cordata*

**Sun/Shade:** full sun

**Salt:** sensitive

**pH:** ≤ 8.2

**Insect/Disease Factors:** various pests are potentially problematic for *Tilia*, although most are rarely serious, *T. x euchlora* more resistant to aphids than *T. cordata*

**Growth Characteristics:**

**Height:** 40'-60'

**Width:** 20'-30'

**Form/Habit:** broadly pyramidal in youth and often with age, sometimes more rounded with age, pendulous lower branches, dense

**Rate:** medium-fast

**Ornamental Characteristics:**

**Flower:** yellowish, drooping clusters attached to pale greenish-yellow leaf-like bracts, mid-summer, likely very fragrant and attractive to bees

**Fruit:** not ornamentally important, small nutlets, globose, attached to bracts, late summer

**Seasonal Foliage Color:** lustrous dark green in summer, green to yellow-green in fall

**Bark:** not ornamentally important, gray-brown, ridged and furrowed on older trunks

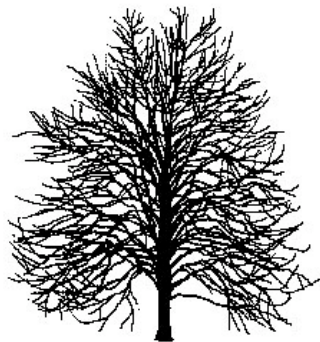
**Other:** buds and twigs are often more green in color

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

**Management Issues:** basal suckering on grafted trees can be a maintenance problem, specify 'own roots' when possible

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** 'Laurelhurst' (compact, broadly pyramidal, straight trunk)



**Scientific Name:** *Tilia tomentosa*

**Common Name:** Silver Linden

**Environmental Conditions:**

**Hardiness Zone:** 5a

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

\*tolerates drought better than *T. cordata*

**Sun/Shade:** full sun

**Salt:** unknown

**pH:** ≤ 8.2

**Other:** tolerates heat better than *T. cordata*

**Insect/Disease Factors:** various pests are potentially problematic for *Tilia*, although most are rarely serious, aphids can be serious problem for *T. tomentosa*, less susceptible to Japanese beetles than other *Tilia*, ‘**Sterling Silver**’ resistant to Japanese beetles, ‘**Satin Shadow**’ reportedly resistant to Japanese beetles

**Growth Characteristics:**

**Height:** 50’-70’

**Width:** 35’-55’

**Form/Habit:** pyramidal in youth, pyramidal to upright-oval with age, generally dense and symmetrical

**Rate:** medium

**Ornamental Characteristics:**

**Flower:** yellowish, drooping clusters attached to pale greenish-yellow leaf-like bracts, mid-summer, very fragrant, latest flowering *Tilia*

**Fruit:** not ornamentally important, small nutlets, egg-shaped with a point, attached to bracts, late summer, often light seed crop

**Seasonal Foliage Color:** shiny dark green above, silvery and pubescent on underside in summer, green-yellow to yellow in fall

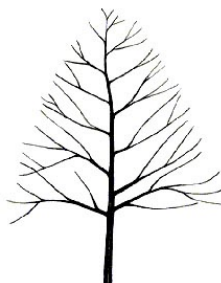
**Bark:** not ornamentally important, smooth light gray, eventually becoming gray-brown, ridged and furrowed on older trunks

**Transplant Issues:** moderately difficult to transplant B&B or bare root, better success in transplanting bare root in fall, do not attempt to transplant > 2” caliper trees bare root, slower to recover from transplanting than other *Tilia*

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** **Green Mountain®** (‘PNI 6051’, fast growing, symmetrical, dense canopy), **Satin Shadow™** (‘Sashazam’, possibly more cold hardy, symmetrical, reportedly resistant to Japanese beetles), **Sterling Silver** ( also listed as ‘**Sterling**’, dense canopy, resistant to Japanese beetle and Gypsy Moth)



**Sterling Silver™**

**Scientific Name:** *Ulmus americana*

**Common Name:** American Elm Cultivars

**Environmental Conditions:**

**Hardiness Zone:** varies, 3b to 5a (see cultivar listing below)

**Soil Moisture:**

VERY WET						VERY DRY					
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** all cultivars listed below show moderate to excellent resistance to Dutch elm disease, although resistance to elm yellows (a fatal disease sometimes known as Phloem Necrosis) and elm leaf beetle (an insect that can cause severe damage in some areas) varies

Cultivar	Elm Yellows	Elm Leaf Beetle
‘New Harmony’	purportedly resistant	resistant
‘Valley Forge’	purportedly resistant	resistant
‘Delaware #2’	susceptible	unknown
‘Jefferson’	unknown	unknown
‘Princeton’	unknown	resistant
‘Washington’	moderately susceptible	unknown

\* ‘Liberty’ is highly susceptible to elm yellows and is not recommended due to variability of resistance to Dutch elm disease

**Growth Characteristics:**

**Height:** 60’-80’, can grow over 100’

**Width:** 40’-80’

**Form/Habit:** vase-shaped

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous

**Fruit:** ½” disc-shaped, matures in spring

**Seasonal Foliage Color:** lustrous green to dark green, often yellow in fall

**Bark:** dark gray, fissured, with broad, deep, intersecting ridges

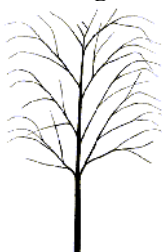
**Transplant Issues:** easy to transplant B&B or ≤ 2” caliper bare root

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars: Most promising new cultivars:** ‘New Harmony’ (zone 5 (4), broadly vase-shaped, more rounded than ‘Valley Forge’, yellow fall color), ‘Valley Forge’ (zone 5, upright arching, vase-shaped, classic American Elm shape, dense, yellow fall color), ‘Jefferson’ (not currently available but will be in the next few years, holds dark green color late into the fall, strong U-shaped branch unions)

**Available:** ‘Delaware #2’ (zone 3b (3a), broadly rounded vase-shaped, sometimes irregular habit, fast growing, bright green foliage), ‘Princeton’ (zone 4 (3b), upright vase-shaped, symmetrical, fast growing, leathery dark green foliage, yellow fall color), ‘Washington’ (zone 3b, classic vase-shape, glossy foliage)



**Scientific Name:** *Ulmus* x species

**Common Name:** Elm Hybrids

**Environmental Conditions:**

**Hardiness Zone:** varies, 3b to 5a (see cultivar listing below)

**Soil Moisture:**

VERY WET												VERY DRY		
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil					
1	2	3	4	5	6	7	8	9	10	11	12			

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** all cultivars listed are resistant to Dutch elm disease, resistance to elm yellows (a fatal disease sometimes known as Phloem Necrosis) and elm leaf beetle (an insect that can cause severe damage in some areas) varies, see chart on page 114

**Growth Characteristics:**

**Height:** 50'-70'

**Width:** 40'-60' typical, can equal height with age

**Form/Habit:** varies with cultivar, see cultivar chart on following page

**Rate:** medium to fast, many cultivars are noted as fast growing on cultivar chart on following page

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous

**Fruit:** ½" disc-shaped, matures in spring

**Seasonal Foliage Color:** green to dark green in summer (all cultivars listed as dark green except **Vanguard™** and **Commendation™**), yellow in fall

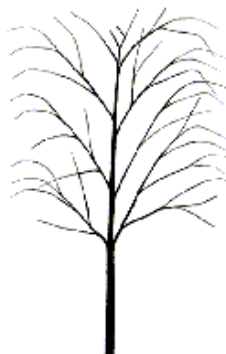
**Bark:** gray to brown, ridged or scaly, varies with these hybrids, can be attractive but none considered highly ornamental as *U. parvifolia* species and cultivars except **'Frontier'** (gray-green bark with orange lenticels due to *U. parvifolia* partial parentage)

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root (except **'Frontier'**, which is difficult to transplant bare root)

**Management Issues:** plants propagated on 'own roots' are preferred, specify when possible

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** see chart on following page



**'Homestead'**

***Ulmus x species (Elm Hybrids):***

<b>Cultivar</b>	<b>Growth Rate and Size</b> (if differs from previous page)	<b>Form/Habit</b>	<b>Foliage</b> (if differs from previous page)
<b>Zone 3</b>			
<b>‘Discovery’</b> (possibly 2b)	more compact, 45’ high, 35’ wide	upright oval to vase-shaped in youth, develops arching vase-shape with age, symmetrical	
<b>‘New Horizon’</b>	fast growing	upright, full crown	large leaves, fall color unknown
<b>Zone 4</b>			
<b>‘Prospector’</b>	typically shorter, 40’ high, 30’ wide, fast growing	vase-shaped, American Elm-like but more dense	larger leaves, emerges with orange tint
<b>‘Regal’</b>		pyramidal to oval, open, sometimes upright branching, potentially good wide branching angles, strong central leader	not glossy, little fall color
<b>‘Sapporo Autumn Gold’</b>	fast growing	conical in youth, potentially vase-shaped and American Elm like, upright and irregular branching, densely branched	emerges with red tint
<b>‘Urban’ (4a)</b>	fast growing	pyramidal to broadly columnar, strong central leader	
<b>Vanguard™</b> (‘MortonPlainsman’)	grows into mid- summer	upright vase-shaped	waxy, glossy, slightly folded
<b>Zone 4 to 5</b>			
<b>Accolade™</b> (‘Morton’)	fast growing	vase-shaped, arching, American Elm-like	glossy
<b>Danada Charm™</b> (‘Morton Red Tip’)	fast growing	vase-shaped, arching, very American Elm-like	glossy, emerges red
<b>Zone 5</b>			
<b>Commendation™</b> (‘Morton Stalwart’)	fast growing	upright oval, symmetrical	larger leaves
<b>‘Frontier’</b>	may have slightly smaller stature, fast growing	pyramidal to upright oval when young, develops vase-shape with age	glossy, emerges with reddish tint, red to reddish- purple in fall, long lasting fall color
<b>‘Homestead’ (5a)</b>		pyramidal to oval, usually becoming arching with age, dense branching when young, symmetrical	dense foliage
<b>‘Patriot’</b>		stiffly upright, vase-shaped, may stay narrower	
<b>‘Pioneer’</b>	fast growing	broad pyramidal in youth, rounded with age, some branches arching, dense	larger leaves
<b>Triumph™</b> (‘Morton Glossy’)		upright oval to vase-shaped, arching, strong branching, symmetrical	glossy

**Ulmus x species (Elm Hybrids) Disease Resistance:** all listed cultivars are Dutch elm disease resistant

Cultivar	Elm Yellows	Elm Leaf Beetle
‘Discovery’	resistant	resistant
‘New Horizon’	unknown	moderately susceptible
‘Prospector’	resistant	resistant
‘Regal’	unknown	susceptible
‘Sapporo Autumn Gold’	unknown	susceptible
‘Urban’	resistant	very susceptible
Vanguard™ (‘Morton Plainsman’)	reportedly resistant	moderately resistant
Accolade™ (‘Morton’)	reportedly resistant	resistant
Danada Charm™ (‘Morton Red Tip’)	reportedly resistant	unknown but likely resistant
Commendation™ (‘Morton Stalwart’)	reportedly resistant	unknown
‘Frontier’	tolerant, likely resistant	moderately resistant
‘Homestead’	resistant	susceptible
‘Patriot’	resistant	resistant
‘Pioneer’	resistant	susceptible
Triumph™ (‘Morton Glossy’)	reportedly resistant	unknown

**Ulmus x spp (Elm Hybrids) Parentage:**

**Accolade™ (‘Morton’)**

(*U. japonica* x *U. wilsoniana*)

**Commendation™ (‘Morton Stalwart’)**

((*U. japonica* x *U. wilsoniana* ‘Morton’) x (*U. pumila* x *U. carpinifolia*))

**Danada Charm™ (‘Morton Red Tip’)**

(*U. japonica* x *U. wilsoniana*)

**‘Discovery’**

(not hybrid, *U. davidiana* var. *japonica*)

**‘Frontier’**

(*U. parvifolia* x *U. carpinifolia*)

**‘New Horizon’**

(*U. japonica* x *U. pumila*)

**‘Homestead’**

(complex, involving *U. pumila*, *U. x hollandica*, and *U. carpinifolia*)

**‘Patriot’**

(complex, crossing ‘Urban’ (complex parentage listed below) with a selection of *U. wilsoniana*),

**‘Pioneer’**

(*U. glabra* x *U. carpinifolia*)

**‘Prospector’**

(not hybrid, *U. wilsoniana*)

**‘Regal’**

(complex, cross ‘Commelin’ (*U. x hollandica* ‘Vegata’ x *U. carpinifolia* #1) with ‘N215’ (*U. pumila* x *U. carpinifolia* ‘Hoersholmiensis’))

**‘Sapporo Autumn Gold’**

(*U. japonica* x *U. pumila*)

**Triumph™ (‘Morton Glossy’)**

((*U. japonica* x *U. wilsoniana* ‘Morton’) x ((*U. japonica* x *U. pumila* ‘Morton Plainsman’))

**‘Urban’**

(complex, involving *U. x hollandica* ‘Vegata’, *U. carpinifolia*, and *U. pumila*)

**Vanguard™ (‘Morton Plainsman’)**

(*U. japonica* x *U. pumila*)



**Scientific Name:** *Ulmus parvifolia*

**Common Name:** Chinese Elm or Lacebark Elm

**Environmental Conditions:**

**Hardiness Zone:** 5b

**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** species shows reliably good resistance to Dutch elm disease, elm yellows, and elm leaf beetle, as well as Japanese beetle

**Growth Characteristics:**

**Height:** 40'-75'

**Width:** 30'-75'

**Form/Habit:** variable, rounded or vase-shaped, often with pendulous branchlets, some almost American Elm-like with upright-spreading branches, while others are broader than tall with broad-spreading branches

**Rate:** medium to fast

**Ornamental Characteristics:**

**Flower:** not ornamentally important, inconspicuous, late summer to early fall

**Fruit:** 1/3" disc-like samara, ripens in fall

**Seasonal Foliage Color:** lustrous dark green in summer, color varies in fall, yellow to reddish purple

**Bark:** extremely ornamental, exfoliates and mottles in combinations of gray, green, orange, and brown, often with burnt orange corky lenticles

**Transplant Issues:** transplant B&B

**Management Issues:** none of significance

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:** *New cultivars selected for various ornamental characteristics and/or cold hardiness are becoming increasingly available. The following newer cultivars are hardy to Zone 5 and currently available: 'Dynasty'* (early introduction, so readily available cultivar, upright vase-shaped, 50' high, 45' wide, dull orange to red fall color but bark extremely inferior to following cultivars and often not even considered ornamental), **Allee®** ('**Emerald Vase**' or '**Emer II**', upright-spreading form, 70' high, 60' wide, dense canopy, trunk irregularly fluted, excellent bark pattern – even on surface roots and 1"-2" diameter branches, bark has burnt orange corky lenticels, subdued yellow fall color), **Athena®** ('**Emerald Isle**' of '**Emer I**', broad-spreading habit, rounded/globe-shaped, 40' high, 55' wide, dense canopy, excellent bark pattern begins 2' off the ground, bark has burnt orange corky lenticels, leathery foliage, very dark green-almost black-in summer, bronze-brown in fall), **Bosque®** ('**UPMTF**', listed as zone 6, narrow crown, 30' wide, foliage is fine-textured and smaller than species, multi-color exfoliating bark), '**Ohio**' (moderately vase-shaped, probably 40'-50' high, 35'-45' wide, perhaps larger, appears more loose and open, attractive gray-orange exfoliating bark, smaller leaves, grass green summer foliage, grayish-red fall color, fruit ripens red-purple color), '**Pathfinder**' (vase-shaped, probably 35'-45' high, 30'-40' wide, perhaps larger, sometimes strong central leader, bark likely similar to 'Ohio', yellow-green leaves in summer, grayish-red in fall, fruit ripens red-purple color), *\*Three cultivars selected for cold hardiness (possibly into zone 4) that may become more available in the near future: 'Hallelujah'* (fast growing, excellent foliage and bark detail), '**Matthew**' (upright vase-shape, strong branches, bark exfoliates at early age), and '**Zettler**' (strong, upright habit, excellent branching structure)

**Scientific Name:** *Zelkova serrata*  
**Common Name:** Japanese Zelkova  
**Environmental Conditions:**  
**Hardiness Zone:** 5b  
**Soil Moisture:**

VERY WET			VERY DRY								
occasionally saturated or very wet soil			consistently moist, well drained soil			occasional periods of dry soil			prolonged periods of dry soil		
1	2	3	4	5	6	7	8	9	10	11	12

**Sun/Shade:** full sun

**Salt:** some observed tolerance

**pH:** ≤ 8.2

**Insect/Disease Factors:** none serious or limiting

**Growth Characteristics:**

**Height:** 50'-70' (can reach 120' in wild)

**Width:** 40'-60'

**Form/Habit:** vase-shaped, generally upright arching branches, short trunked

**Rate:** medium, possibly fast in youth

**Ornamental Characteristics:**

**Flower:** not ornamentally important, usually present as leaves are emerging

**Fruit:** not ornamentally important, ripens in fall

**Seasonal Foliage Color:** medium or dark green in summer, variable color in fall, often russet-yellow, but full range possible - brown/yellow/orange/red/purple

**Bark:** extremely ornamental, reddish brown and cherry-like in youth, exfoliates and mottles with age in oranges, grays and browns

**Transplant Issues:** easy to transplant B&B or ≤ 2" caliper bare root

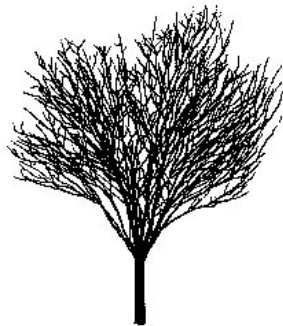
**Management Issues:** narrow crotch angles and poor branch attachments which may give rise to splitting and form damage when older

**Suggested Uses:** narrow or wide street tree lawns/pits, parks, suitable for CU-Structural Soil™

**Cultivars:**

**Common:** following three are fast growing selections ('Halka' is fastest, followed by Green Vase®, then Village Green™), **Green Vase®** (60'-70' high, upright vase-shaped, orange-brown to bronze-red fall color), **'Halka'** (60'-70' high, graceful arching branches, often better branch attachment, most American Elm-like, summer foliage color not dark green like other cultivars, yellowish fall color), **Village Green™** (50'-60' high, broadly vase-shaped, width equal to height, dark green foliage, rusty red fall color)

**Available:** **'Green Veil'** (listed as zone 4, dark green leaves, branchlets somewhat pendulous, not as fast growing as most common three cultivars listed above), **'Illinois Hardy'** (possibly more cold hardy, zone 5a), **'Musashino'** (narrower, upright form, 20' wide, yellow fall color), **'Spring Grove'** (dark green foliage, wine red fall color)



**Green Vase®**