TRIAL LIST

A handful of trees have proven outstanding under street conditions, and this has contributed to their extensive use to the exclusion of many others that, if tested, might prove equally functional. The major reason for trying new trees is to expand the genetic composition represented along our city and suburban streets and, over the long term, to build greater population stability to resist devastation through insect, disease, or abiotic factors. If those towns and cities where every street was planted with American elm (Ulmus americana) had practiced diversification, the ruination of the landscape would not have been so devastating.

Many municipalities now have tree ordinances that specify that a single species, including all cultivars, may not constitute more than 10 percent of the total tree population. Unfortunately, most landscape planners work from a favorite list and do not make use of the wide diversity available.

The trees on the trial list that follows have proven to be good performers in the Arnold Arboretum or in other gardens across North America. For the most part, they all have been maintained under reasonable growing conditions and not under the stresses encountered along urban streets. Only long-term trial under a variety of growing conditions will provide adequate data relative to their performance on city streets.

A major problem will be finding adequate sources of supply, for many of these trees are currently represented only in arboreta or botanical gardens. A few of these species are available commercially in limited quantities and small sizes, but most will need to be custom propagated and grown on before planting. As a result, an innovative spirit among nurserymen and landscape planners is needed.

The Arnold Arboretum, and perhaps other public gardens, will supply cuttings, scions, or seeds to any nurseryman, arborist, or street tree commission who wishes to test these trees but cannot locate a commercial source. To obtain test material from the Arnold Arboretum write:

Street Tree Trials
The Arnold Arboretum of Harvard University
The Arborway
Jamaica Plain, MA 02130
Acer cappadocicum

**Coliseum Maple**

HEIGHT. 40-60 feet
SPREAD. 20-30 feet
HABIT. upright-oval

ZONE: 5
ENVIRONMENT: full sun to light shade; well-drained soil; pH adaptable

This maple has proven itself as a street tree in several cities in the Pacific Northwest. Summer foliage is dark green changing to yellow in the autumn. The cultivar 'Rubrum' is unusual because the young leaves emerge red before turning green. This maple is pest free, and easy to transplant. The canopy is light-headed and the root system sufficiently deep so that solid grass cover can be maintained easily.
**Acer velutinum**  
**Persian Maple**

**HEIGHT**: 70-90 feet  
**SPREAD**: 50-70 feet  
**HABIT**: rounded

**ZONE**: 6 (5?)  
**ENVIRONMENT**: full sun; well-drained soil

Persian maple has proven itself to be tough and adaptable as an avenue tree in Victory Park, Tbilisi, U.S.S.R. Its leaves resemble those of *Acer pseudoplatanus*, sycamore maple, for they are large, thick, and dark green in the summer landscape, with little or no autumn color. Yellowish-green flowers in upright panicles are ornamental. This maple is a rapid grower, easy to transplant and appears to be free of insect and disease pests. It is recommended here in an attempt to broaden the genetic diversity of the genus *Acer* in North America. Availability will limit use.

**Alnus cordata**  
**Italian Alder**

**HEIGHT**: 30-50 feet  
**SPREAD**: 20-30 feet  
**HABIT**: softly pyramidal in youth and old age

**ZONE**: 5  
**ENVIRONMENT**: full sun; thrives in poor, dry soil but prefers moist (wet) situations; tolerates acid or alkaline soils, withstands compaction
Alnus cordata is undoubtedly one of the handsomest of the alders. Its glistening medium to dark green leaves persist into fall and do not appear as coarse as the leaves of A. glutinosa. The rich, dark brown, cone-shaped fruits are the largest of those on species in cultivation. This is a splendid lawn tree that would make a fine urban tree as well, though it has not been tried to any degree. Italian alder grows rapidly and, along with A. glutinosa, is quite tolerant of high pH soils. The use of A. glutinosa along interstate highways has prompted the authors to suggest A. cordata as an alternative because of its superior ornamental characteristics.

**Alnus glutinosa**

**European Alder**

HEIGHT: 40-60 feet
SPREAD: 20-40 feet
HABIT: weak pyramidal outline; may develop ovoid or oblong head of irregular proportions

ZONE: 3
ENVIRONMENT: full sun or light shade; wet or dry, acid or alkaline soil; extremely adaptable

Alnus glutinosa 'Fastigiata'
One of the best trees for extremes of soil and climate, the common alder currently is used by highway departments along interstate highways and freeways. It will survive sites with standing water, where it will seed naturally and develop thickets; but it makes its best growth in well-drained, evenly moist soils. Its adaptability to dry soils is an asset. Lustrous, dark green foliage holds late into fall. *Alnus glutinosa* may suffer from leaf miner, tent caterpillar and stem cankers, and the wood is somewhat weak. This species and *A. cordata* are able to fix atmospheric nitrogen which allows them to survive in low-fertility soils. The former is worth considering for areas where few other trees will grow. 'Pyramidalis' ('Fastigiata') is an upright form that resembles Lombardy poplar in outline but is slower growing. This species is useful only where more ornamental trees may not thrive.

*Betula nigra*  
River Birch
The most widely distributed American birch, *Betula nigra* ranges from Minnesota to Florida, and Massachusetts to Kansas. In the Arnold Arboretum, it is one of the tallest birches. It consistently outperforms the white-barked species in warmer climates. The medium green, summer foliage is lustrous, but fall color is a poor yellow-green. Leaves tend to spot in wet weather. The bark exfoliates in papery sheets, exposing the inner bark which can exhibit color combinations of gray-, cinnamon- and reddish-brown. River birch is resistant to the bronze birch borer and is quite tolerant of wet soils, for it occurs in the wild along stream banks and swampy bottomlands that are periodically flooded. Tests conducted at the shade tree plots of the Ohio State University in Wooster, Ohio, indicate that this tree grows 2-3 feet per season. River birch is probably a better choice for urban situations than white-barked species but is still subject to having its bark stripped by vandals.

*Carpinus tschonoskii*  

**Yeddo Hornbeam**
Yedo hornbeam is recommended in order to widen the array of useful plants in the genus *Carpinus*. It features medium green, summer foliage turning yellowish-brown in the autumn. The tree is a slow grower but once established is durable and dependable. Transplanting may present some difficulties for it is slow to re-establish itself. This plant appears to be pest free, structurally strong, and culturally adaptable.

**Catalpa ovata**

**Chinese Catalpa**

**Catalpa speciosa**
The common and western catalpa (*Catalpa bignonioides* and *C. speciosa*) found their way into highway landscapes earlier this century but have fallen into disfavor because of their large, coarse foliage and litter from flowers, leaves, and fruits. Despite these drawbacks, they remain adaptable ornamental trees. *C. ovata* is similar to *C. bignonioides* except that it is smaller in stature and has smaller leaves, flowers, and fruits. During June, erect pyramidal panicles of yellowish-white flowers adorn the tree. They are followed by slender, 8-12 (-18)-inch-long greenish capsules. Chinese catalpa is extremely easy to grow from seed, one year seedlings are known to have flowered and fruited. Availability will limit use.

*Celtis jessoensis*  

**Jesso Hackberry**
Common hackberry (Celtis occidentalis) is a tough, durable and adaptable plant for difficult urban landscapes, but its use has been discouraged because of unattractive witches-brooms and leaf galls. From our observations and on the basis of limited trials, C. jessoensis appears to be free of both problems. The semilustrous, rich green leaves are free of the nipple gall and mottling that are prevalent on C. occidentalis. In addition, it develops strong crotch angles, an upright branching habit, and smooth gray bark. It appears to have the characteristics of a good street tree. Summer foliage is rich green changing to pale yellow in the autumn. Availability will limit use. This Asiatic species is the most ornamental of the hackberries in the Arnold Arboretum’s collections. Recent laboratory hardiness determinations at the University of Minnesota have shown it to be cold-hardy to at least −16°F.

Chionanthus retusus

Chinese Fringetree
Most gardeners are familiar with Chionanthus virginicus, our native fringetree, but know nothing of the Chinese species. The Arnold Arboretum has several accessions and some are shrubby and weak-growing, while the most notable is a small tree with singularly beautiful branch structure, bark, and flowers. The dark green foliage does not develop good fall color. The snow-white flowers are produced in terminal panicles during late May and June. Flowering is heavy in alternate years. Dark blue fruits develop only on pistillate plants. Little is known about pollution tolerance but the species certainly deserves testing in this regard. Slow growth may limit use but C. retusus merits a place in special landscape plantings. It is more easily rooted from softwood cuttings than its American relative, and superior forms could be perpetuated.

**Cornus alternifolia**  
**Pagoda Dogwood**

<table>
<thead>
<tr>
<th>HEIGHT:</th>
<th>15-25 feet</th>
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<tbody>
<tr>
<td>SPREAD:</td>
<td>variable, but often wider than high</td>
</tr>
<tr>
<td>HABIT:</td>
<td>low-branched small tree or large shrub with horizontal branching pattern</td>
</tr>
<tr>
<td>ZONE:</td>
<td>3</td>
</tr>
<tr>
<td>ENVIRONMENT:</td>
<td>light shade; moist to dry, acid soil; excessive heat may cause decline</td>
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</table>
This is a beautiful native species that appears almost weedlike in the Smoky Mountains. The authors have observed it growing in dense shade in moist, alluvial soils. The medium to dark green summer foliage is followed by soft reddish-purple fall color which, unfortunately, is not consistent. The leaves are arranged in an alternative fashion, differentiating the species from most dogwoods. White flowers are borne above the foliage in May/June and yield purplish-black fruits on rose-red stalks in July/August. It is much more dependable than *Cornus florida* for flowers. Winter stem color is a lustrous brown to purple, and large trunks develop an interesting, interlacing, ridged-and-furrowed pattern of soft gray. As the plant matures, the branches become horizontally disposed. The species is susceptible to twig canker which may limit landscape use, but vigorous plants are not as susceptible. When used in above-ground containers, *C. alternifolia* makes a superlative plant. It has much to offer, as do *C. controversa* and *C. macrophylla*, but needs some shade for best growth. Use where space permits the low, spreading, branching habit.

**Cornus controversa**

**Giant Dogwood**

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>20-40 feet</th>
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</thead>
<tbody>
<tr>
<td>SPREAD</td>
<td>15-30 feet</td>
</tr>
<tr>
<td>HABIT</td>
<td>pyramidal, becoming flat-topped and horizontally branched</td>
</tr>
</tbody>
</table>

**ZONE 5**

**ENVIRONMENT**. full sun to light shade; well-drained soil
On this species, tiers of horizontal branches bear an abundance of creamy-white flowers in terminal clusters during May. In autumn the plant has black fruit and foliage colors of bronze to red. Branchlets are gray with longitudinal fissures. *Cornus controversa* needs to be evaluated for resistance to drought stress and to salts found along highways. It is susceptible to twig canker, but vigorous specimens exhibit good resistance. In vegetative and reproductive characteristics, this species is similar to *C. alternifolia*. Laboratory cold-hardiness tests indicated stem hardiness to at least $-38^\circ$F, which means *C. controversa* could be grown at least another zone north of the range described by Rehder in *Manual of Cultivated Trees and Shrubs*.

**Cornus macrophylla**  
Largeleaf Dogwood

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>20-40 feet</th>
<th>ZONE</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPREAD</td>
<td>15-30 feet</td>
<td>ENVIRONMENT:</td>
<td>full sun to light shade; well-drained, acid or alkaline soil</td>
</tr>
<tr>
<td>HABIT</td>
<td>pyramidal to rounded</td>
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</table>

Summer flowering trees are often neglected in favor of spectacular spring performers. This deciduous tree bears large flat clusters of creamy-white flowers in July, followed by blue-black fruits. The birds quickly consume the fruit but the stalks turn rose-pink and are ornamental for two to three weeks in autumn. Leaves hold late into the fall and were still green in mid-November, 1978. This species can be easily rooted from cuttings. In laboratory tests, the stems proved hardy to $-22^\circ$F.
Corylus colurna  

**HEIGHT:** 40-50 feet  
**SPREAD:** 20-30 feet  
**HABIT:** pyramidal with very uniform branch structure  

**ZONE:** 4  
**ENVIRONMENT:** full sun; thrives in hot summers and cold winters; withstands drought; pH adaptable
The mention of Corylus colurna strikes fear into the hearts of landscape architects, nurserymen, and teachers of plant materials because most have never heard of it. The authors cannot remember ever seeing a disheveled specimen, but admittedly all specimens they have seen were housed in arboreta, botanic gardens, campuses or cemeteries. The dark green summer foliage holds late and may turn a yellow-green in fall. The gray-brown bark develops a scaly characteristic, and as the scales fall, a rich orange-brown inner bark is exposed. Branches are widely spaced, arise from U-shaped angles, and appear to have great structural strength. The fruits are quite large and create some litter, though squirrels are fond of the nuts and effectively remove many of them. Although not enough is known of its urban tolerance, C. colurna should be more widely tried in cities, possibly as a containerized tree. It reportedly is doing well in the Minneapolis, Minnesota area where winter lows may reach −30°F.

**Crataegus laevigata 'Superba'**  
(also listed as C. l. 'Crimson Cloud')

<table>
<thead>
<tr>
<th>Trait</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td>15-20 feet</td>
</tr>
<tr>
<td><strong>SPREAD</strong></td>
<td>10-15 feet</td>
</tr>
<tr>
<td><strong>HABIT</strong></td>
<td>pyramidal to rounded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trait</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZONE</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>ENVIRONMENT</strong></td>
<td>full sun; tolerant of sandy or clayey soils; pH adaptable</td>
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</table>

Reports coming into the Arnold Arboretum are mixed about this plant. Some consider it valuable, while others report minimal success. Its landscape attributes include single bright red flowers with a white star-shaped center (May) and persistent red fruits. Its limitations include susceptibility to fire blight, cedar hawthorn rust and lace-bug, however, it is resistant to the leaf spot that is so troublesome on C. laevigata 'Paulii'.

**Crataegus punctata 'Ohio Pioneer'**

<table>
<thead>
<tr>
<th>Trait</th>
<th>Value</th>
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<tbody>
<tr>
<td><strong>HEIGHT</strong></td>
<td>20-30 feet</td>
</tr>
<tr>
<td><strong>SPREAD</strong></td>
<td>20-30 feet</td>
</tr>
<tr>
<td><strong>HABIT</strong></td>
<td>rounded; densely foliaged</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trait</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ZONE</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>ENVIRONMENT</strong></td>
<td>full sun; heavy clay to well-drained soil; pH adaptable</td>
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</tbody>
</table>

This is a new cultivar that may prove outstanding with time. The authors have seen the parent tree and were impressed with the abundant white flowers (May) and the clean foliage. The fruits are red and quite large, and the stems exhibit a silver-gray color. Fire blight has not appeared to be a problem and the plant seems resistant to rust. The cultivar is essentially thornless, which will permit use in high traffic areas. Like most hawthorns, it is well adapted to dry, compacted soils and would make a good street or container plant.
Successful street plantings in Cleveland, Ohio, and Indianapolis, Indiana, demonstrate that this tree warrants greater trial. Eucommia performs well in a variety of climates and soils, shows good heat, drought and cold tolerance, and has no serious insect or disease pests. The lustrous, dark green foliage holds late. Variable in habit when seed-grown, it is often wide-spreading and low-branched. Trees must be headed-up for street tree use. The species is worth trying in difficult, compacted sites, and probably is best suited for parks or spacious areas because of its wide crown.
**Fraxinus excelsior 'Hessei'**

**Hesse European Ash**

- **HEIGHT:** 50-60 feet
- **SPREAD:** 30-50 feet
- **HABIT:** upright-oval in youth, at maturity rounded
- **ZONE:** 5
- **ENVIRONMENT:** full sun; moist to dry soils; pH adaptable

This is an unusual ash, for the leaf is simple rather than pinnately compound. Leaves are leathery, lustrous, dark green and do not develop fall color. The tree is fast growing and forms a uniform head in a short time. Like all European ash cultivars, it may prove susceptible to borer damage but to date has proven quite resistant. At the University of Minnesota Landscape Arboretum (−30°F), *Fraxinus excelsior* and the cultivars 'Kimberly Blue', 'Hessei', and 'Aurea' have not proven hardy. Interest in new ash cultivars is always high because the genus shows good resistance to pollutants and poor soil conditions.

**Fraxinus nigra**

**Black Ash**

- **HEIGHT:** 30-50 feet
- **SPREAD:** 30-40 feet
- **HABIT:** small to medium-sized, sparsely branched tree of pyramidal to rounded outline
- **ZONE:** 2
- **ENVIRONMENT:** full sun; dry or wet soil; pH adaptable.
Black ash is not well known for street tree use but may have possibilities because of its adaptability to wet, boggy conditions. The dark green summer foliage does not color well in fall. The bark tends toward a flaky or corky characteristic. Occurring naturally in low, swampy ground from Newfoundland to Manitoba, south to Virginia and Arkansas, the species has performed well in the University of Minnesota Landscape Arboretum. The male cultivar, 'Fallgold', which originated at the Canadian Agricultural Research Station, Morden, Manitoba, has disease-free foliage that develops golden fall coloration. Fraxinus nigra offers genetic diversity in areas where green ash (F. pennsylvanica) is the dominant street tree species.

Fraxinus ornus

Flowering Ash

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>30-40 feet</th>
<th>ZONE. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPREAD</td>
<td>20-30 feet</td>
<td>ENVIRONMENT full sun; moist, well-drained soils</td>
</tr>
<tr>
<td>HABIT</td>
<td>compact; upright-oval to rounded, rather stiff and coarse</td>
<td></td>
</tr>
</tbody>
</table>
Seldom seen in American landscapes but long popular in European gardens, this species has showy, fragrant, creamy-white flowers borne in 5- to 6-inch panicles in May. The leaves are dark green and offer no fall color. Based on observations throughout the East and Midwest, the species lacks vigor although a West Coast nursery is now promoting it. Its hardiness is suspect and temperatures lower than $-10^\circ$ F may induce injury. Borers, scale and canker may limit the tree's landscape effectiveness, especially where urban stresses exist.

*Fraxinus quadrangulata*  
Blue Ash
This species is one of the ashes most tolerant of dry soils, although it does well in moister conditions. The branches are four-angled and winged. The lustrous green summer foliage turns a pale yellow in autumn. The bark is different from that of most ashes since it develops a scaly appearance, rather than the more typical ridged and furrowed diamond patterns. The species has proved to be difficult to propagate and is considerably slower growing than either *Fraxinus americana* or *F. pennsylvanica*. It is hardy in Minnesota (−30°F) and deserves further trial.

**Halesia carolina**

Carolina Silverbell
Halesia carolina is a superior tree from many aspects: attractive foliage and bark; white, bell-shaped flowers in May; and interesting four-winged fruits. Its one drawback is that it is not uniform in habit and for this reason it has been shunned in street and city plantings. Although somewhat slow to establish after transplanting, it is easily rooted from softwood cuttings and maintenance of specific characteristics is relatively simple. Halesia exhibits excellent disease and insect resistance. Chlorosis may develop in extremely high pH or compacted soils. Carolina silverbell is best suited to growing in large areas and could be used to advantage in city parks or along large parkways. It has been reported that the species is susceptible to wind-throw, especially after heavy rains which loosen the soil.
Kalopanax pictus  

Castor-aralia

HEIGHT: 40-60 feet
SPREAD: 40-60 feet
HABIT: upright-oval to obovate in youth; assumes a rounded outline with massive, heavy branches in old age

ZONE: 4
ENVIRONMENT: full sun; deep, rich moist soil; pH adaptable
Kalopanax pictus is a large, coarse tree with a tropical appearance. The large, dark green leaves turn yellow (reddish-purple) in the fall. Terminal clusters of small whitish flowers that open in July/August are followed by purple-black fruits in September/October. The blackish bark is deeply ridged and furrowed, and the young stems are covered with prominent spines that persist on older branches. For this reason, castor-aralia may be a worthwhile alternative in high vandalism areas. The species has proved hardy to −33°F in laboratory tests.

Metasequoia glyptostroboides  
Dawn Redwood

HEIGHT: 60-70 feet (100 feet)  
SPREAD: 15-25 feet  
HABIT: pyramidal  
ZONE: 5  
ENVIRONMENT: full sun; dry to moist, well-drained soil; pH adaptable
This species was introduced into cultivation through the diligent efforts of the Arnold Arboretum. The feathery, green summer foliage gives way to colors ranging from salmon- to gold-bronze. The autumn color effect with back lighting is superb. *Metasequoia* grows rapidly; there are reports of 2-4 feet in a single year under favorable conditions. Growth habit is very symmetrical, with a strong central leader. With age, the trunk develops a handsome buttressed or fluted effect at the base. The plant is deciduous, which often causes confusion among those who cannot understand why their “needled evergreen” is losing its foliage. In the Washington, D.C. area, stem canker was first reported and now canker infection has been noted on many established trees around the country. A colony of large trees, in small planting islands, has been used at the World of Chocolate exhibit in Hershey, Penn., where it gives a sense of age to plantings that are only a few years old. *Metasequoia* is ideal for park and street plantings where a quick screen is needed. In New Jersey, it has been successfully used as a street tree when the lower branches were removed. The fastest growth is made in warm climates and Zone 6 conditions south should prove most favorable.

*Morus rubra*  
Red Mulberry

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>40-70 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPREAD</td>
<td>40-50 feet</td>
</tr>
<tr>
<td>HABIT</td>
<td>upright, more open and irregular than <em>M. alba</em> although extremely variable</td>
</tr>
</tbody>
</table>

ZONE 5  
ENVIRONMENT. full sun, prefers a rich, moist soil; pH adaptable
A native mulberry that has not been tried for landscape use, this has leaves, fruit, and an ultimate plant size that are larger than are those of *Morus alba*. Male forms should be selected, for the fruit on pistillate plants may create a litter problem. Birds relish the fruit, which may ultimately contribute to weed seedling problems. *M. rubra* is worthy of trial along freeways and in urban parks that are subject to high visitor impact.

**Ostrya virginiana**

*American Hophornbeam*

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HEIGHT: 25-40 feet  
SPREAD: 25-40 feet  
HABIT: very graceful small tree; pyramidal in youth, usually rounded in old age  
ZONE: 4  
ENVIRONMENT: full sun to heavy shade, cool, moist, well-drained, acid soil

The authors believe this tree has been overlooked for street and city plantings. It has succeeded in suburban areas but no adequate documentation is available concerning its tolerance to heavily polluted conditions. The dark green foliage is pest free and may turn yellow in the fall. The grayish-brown bark develops a slight shaggy character and is quite handsome in winter. In the wild the species is often found on gravelly, rocky, rather dry soils. *Ostrya virginiana* is somewhat slow to re-establish after transplanting but if handled in small sizes and moved in spring, it should succeed admirably. The species has been used successfully as a street tree in New Jersey. Since plants are all seed-grown, variation in habit must be expected.
Pistacia chinensis photographed near Tung River, China, in 1908 by E. H. Wilson.

HEIGHT:  40-60 feet
SPREAD:  30-50 feet
HABIT:  upright to irregular

ZONE:  6
ENVIRONMENT:  full sun; well-drained, acid or alkaline soil; drought tolerant

This is a deciduous tree noted for its glossy, pinnately compound foliage that turns rich shades of orange to reddish-purple in autumn. Terminal clusters of red fruit give ornament to pistillate trees. The light, airy foliage canopy allows the passage of filtered light as does Gleditsia triacanthos, and the tree underplants well because of the deep root system. It is an ideal plant for courtyards and mass plantings. Young trees require staking and corrective pruning to establish good form and branch structure. Chinese pistache is a strong-wooded tree with excellent disease and insect resistance. The hardiness range of the species has never been fully explored.
Populus tremula 'Erecta'  
Upright European Aspen

This cultivar is a narrow, fastigiate clone which was found in the forests of Sweden. Its foliage and habit are somewhat similar to that of Populus nigra 'Italica', Lombardy poplar. While not as fast growing, 'Erecta' is resistant to the canker that afflicts the Lombardy poplar. In wet seasons, however, 'Erecta' may contract a leaf disease that partially defoliates the tree. It is adaptable to cold climates and is performing admirably in Minnesota (−30°F). It is perfect for narrow spaces and for creating visual barriers. This European aspen propagates easily from root cuttings.
**Prunus cyclamina**

HEIGHT: 15-25 feet  
SPREAD: 15-25 feet  
HABIT: spreading, low-branched, eventually broad rounded in outline  
ZONE: 4  
ENVIRONMENT: full sun; well-drained soil

This rare Chinese cherry species continues to thrive at the Arnold Arboretum even when others have declined because of virus or nematodes. It is a deciduous tree that bears single, delicate pink flowers in early to mid-April. The flower color is highlighted by the bronze color of the new foliage. Rain and wind cause the flowers to shatter quickly. The plant is structurally strong and appears to have a vigor and durability similar to *Prunus sargentii* or *P. × yedoensis*. Laboratory tests have shown it to be hardy to −33°F.

**Prunus 'Okame'**

HEIGHT: 15-20 feet  
SPREAD: 10-15 feet  
HABIT: pyramidal in youth; upright-oval when mature  
ZONE: 5  
ENVIRONMENT: full sun; well-drained soil

Okame Cherry
This deciduous tree flowers in early April, bearing single pink flowers. Observations at the Morris Arboretum indicate that flowers are preceded by dark maroon buds and after the petals drop, the red calyx (flower base) and stamens persist for another week. The flowering effect is remarkably durable, generally lasting two to three weeks. The small, finely-textured leaves turn bronze in autumn. Because of its compact size, this tree is perfect for areas with restricted head space, such as under low utility wires. It is useful as a specimen, massed, or grown in staggered rows to create a hedgelike effect.

**Prunus padus**

**European Birdcherry**

| HEIGHT: | 30-40 feet |
| SPREAD: | 30-40 feet |
| HABIT: | rounded, low-branched, dense |

ZONE: 3  
ENVIRONMENT: full sun; average, well-drained soil; pH adaptable

Cherries are not long-lived trees but this species tends to show good vigor and adaptability. It is one of the first trees to leaf out and the handsome white flowers appear in April and May. It suffers, however, from typical cherry maladies and black knot disease limits its widescale use. For groups or masses along interstate highways it might have merit.
Pterocarya fraxinifolia

Caucasian Wingnut

HEIGHT: 30-60 feet
SPREAD: 30-60 feet
HABIT: rounded to wide-spreading; tends to branch low
ZONE: 5
ENVIRONMENT: full sun; moist, well-drained soil; pH adaptable
This tree has been used successfully in Seattle, Washington, and widely in Vienna, Austria, as a street tree. It becomes large with a massive stem and a wide-spreading crown. The leaves are dark green, pinnately compound, and show no propensity to develop good fall color. The winged fruits are borne in pendent clusters 12-20 inches long. The fruit structures are ornamental but pose a litter problem in autumn. The wood tends to be brittle with occasional breakage from storms. The tree should be grown where it has space to develop its full canopy. Additional species that deserve trial include *Pterocarya rhoifolia*, *P. stenoptera* and *P. × rehderana*. Absolute hardiness is suspect, and laboratory tests with *P. × rehderana* have shown it to be hardy to −11°F. These authors have observed large trees in the Vineland Agricultural Experiment Station, Ontario, Canada and Cave Hill Cemetery, Louisville, Kentucky.

**Quercus cerris**

**Turkey Oak**

**Quercus shumardii**

**Shumard Oak**

This is one of the most rapid-growing oaks, with young, established trees sometimes averaging 2-3 feet of growth in a year. Summer foliage is dark green and the autumn foliage is brown. On young trees the leaves may be retained into early spring, this causes problems in thin-stemmed specimens, for the ice and snow loads from winter storms may cause the trees to bend and break. The species is somewhat difficult to transplant.
HEIGHT: 50-70 feet
SPREAD: 50-70 feet
HABIT: large tree reminiscent of pin oak (Q. palustris) but does not have the drooping branches

This species is often confused with red, scarlet and pin oaks and appears to have potential for street and city use. The lustrous, dark green leaves turn red in fall. It is found in the wild on a wide range of sites, varying from stream banks and bottomlands to dry uplands and ridges. It is apparently more difficult to transplant than pin and red oaks. Trees for northern areas should be grown from seed collected at the northern edge of the range. A tree in the Secrest Arboretum, Wooster, Ohio, grew 50 feet in twenty-five years.

**Rhus chinensis**

**Chinese Sumac**

HEIGHT: 15-18 feet
SPREAD: variable
HABIT: loose, suckering shrub or can be grown as a small, round-headed, flat-topped tree

This species is not well known in this country because of the native and more popular *Rhus glabra* and *R. typhina*. The habit is extremely variable, ranging from a large colonizing shrub to a small tree. The rich green foliage changes to yellow, orange and red in fall. Showy terminal panicles of yellowish-white flowers open in August and September and are followed by orange-red drupes. The species is useful for banks, cuts and fills, and other poor soil areas, and is difficult to kill once established. Root cuttings are the preferred method of propagation.
**Sorbus esserteauiana**  
Chinese Mountain-ash

<table>
<thead>
<tr>
<th>HEIGHT</th>
<th>20-30 feet</th>
<th>ZONE.</th>
<th>5 (4°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPREAD</td>
<td>15-20 feet</td>
<td>ENVIRONMENT</td>
<td>full sun; well-drained soil, pH adaptable</td>
</tr>
<tr>
<td>HABIT.</td>
<td>upright-oval</td>
<td></td>
<td></td>
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</tbody>
</table>

At the Arnold Arboretum, this is one of the best trees for autumn color with foliage in brilliant shades of yellow, orange, red, and bronze. It is a deciduous plant with large terminal clusters of small, creamy-white flowers in May. The orange to scarlet fruit is ornamental in late September and October, but is quickly eaten by birds. This species may be susceptible to borers and to fire blight. It probably will be most successful from an ornamental and cultural standpoint when grown in colder regions of the country.
**Symplocos paniculata**  

**Sapphireberry**

**HEIGHT.** 15-20 feet

**SPREAD:** 10-20 feet

**HABIT.** large, multistemmed shrub; upright-arching branches; almost honeysuckle-like in outline

**ZONE.** 5

**ENVIRONMENT** full sun; well-drained, acid to neutral soil
This most unusual fruiting shrub is one that is not well-represented in American landscapes. The rich green foliage is insect and disease free. The creamy-white, fragrant flowers open in May and are followed by sapphire-blue fruits in September. Unfortunately, the fruits are often consumed by birds. Flowering and fruiting tend to be heaviest in alternate years. The authors have seen tree forms that might be suitable for wide parkways. Usually the plant is multi-stemmed and could be utilized best along freeways for mass effect or in large planting islands. Sapphireberry also might be a good shrub for above-ground containers. The species is long-lived, structurally sound and requires minimal maintenance to keep it in presentable condition.

*Tilia japonica*  
Japanese Linden
This is a rare linden, with dark green foliage and abundant creamy-yellow flowers in July. It is texturally different from *Tilia cordata* and more graceful in outline. Its use would add species diversity. Laboratory tests have shown the plant to be stem hardy to $-49^\circ$F.

**Tilia mongolica**

Height. 30-45 feet  
Spread: 25-55 feet  
Habit. not the typical pyramidal outline of most *Tilia* species; tends to be loose, floppy, and irregular; some branches show a slight pendulous tendency

Another rare linden, *Tilia mongolica* is not as handsome as *T. japonica* or *T. cordata*. The lustrous, dark green foliage is deeply incised and appears grape-like. The winter stem color is often listed as red, but on the Arnold Arboretum tree is reddish-brown. The yellowish-white flowers open in July. This linden is more prone to storm damage than most others. It does not develop a uniform head without considerable pruning, but it may prove to be useful in containers where other lindens would be too large.
Zelkova carpinifolia

**Elm Zelkova**

**HEIGHT**: 40-70 feet

**SPREAD**: 20-50 feet

**HABIT**: conical to oval-rounded; variable when grown from seed, branching tends to be strongly upright

**ZONE**: 6

**ENVIRONMENT**: full sun; well-drained soil; pH adaptable
Longevity, structural strength, and distinctive exfoliating bark make this a highly desirable tree. It is a slow grower, and nurserymen state that it takes too long to reach saleable size to be productive from the commercial viewpoint. For those willing to wait for a good thing, this tree is exceptionally long-lived: two hundred- to three hundred-year-old specimens are common in Europe. Young trees have smooth gray bark; on older specimens it is exfoliating, revealing colors of tan, green and pale orange against a background of gray. Elm zelkova is extremely variable in shape when grown from seed, therefore grafted selections are preferable. One specimen that is 60-80 feet high and 15-18 feet wide grows along the reflecting basin at the foot of the Capitol Building in Washington, D.C. In the winter landscape this one specimen stands out from all neighboring trees because of its distinct habit and bark. The species is susceptible to Dutch elm disease.

Zelkova sinica

**Zelkova sinica**

**Chinese Zelkova**

**HEIGHT:** 30-50 feet  
**SPREAD:** 20-40 feet  
**HABIT:** rounded to somewhat vase-shaped; not unlike *Z. serrata* in outline, often multiple-stemmed

**ZONE:** 6

**ENVIRONMENT:** full sun to light shade, well-drained soil; pH adaptable

This slow-growing tree remains in scale with small landscape spaces for years. When young, it has smooth, gray bark which, with age, exfoliates in patches, revealing colors of gray, beige, and pale green. The tree is often multistemmed with strongly ascending branches; with proper pruning it can be headed up into a street tree. The foliage assumes tints of golden-brown in autumn. Its hardiness is suspect below -5° to -10°F. Two-year-old stock was severely injured in Illinois, and trees in the Morton Arboretum, Lisle, Illinois, have struggled; at the Arnold Arboretum, mature trees have developed frost cracks on the trunk.