

Certified Nursery &  
Landscape Professional

**C N L P**



# Training Manual

**New York State Nursery &  
Landscape Association**

**2022**



## **New York State Nursery & Landscape Association**

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# PLANT ID

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# Plant Identification

This chapter contains the following sections to help you understand the basics of plant identification and to prepare you for the Plant ID portion of the CNLP Exam. Also included is a list of references which you will find helpful in gathering information on these plants.

## Section included are:

1. Introduction
2. Identifying Characteristics of Plants
3. Recommended Urban Trees
4. Recommended Conifers for Urban Sites
5. Shrubs for Difficult Sites
6. Plant Recommendations for Various Site Conditions
7. Plants to be Identified on the CNLP Exam

## Introduction

Plants are the foundation of the horticulture industry. The plants that are grown in nurseries, and utilized in landscape plantings, vary from small grassy species for lawn purposes to large trees for shade. Being able to identify plants is an important first step in becoming a landscape professional.

Many plants have unique shapes or cultural requirements that dictate where and how they are grown or used. By knowing the identifying characteristics to use, one can begin to appreciate the subtle differences that often exist and are required for proper identification.

Also, communication is improved in that other horticulturists will have a clear understanding of what you are describing. Without proper identification, information on cultural requirements could not be researched whereas plants may be placed in circumstances that do not foster good growth.

Perhaps the easiest way to identify plants during the growing season is by looking at the leaves. Leaf arrangement, leaf characters, type, shape and presence/absence of petioles and/or hairs or wax are all key elements used in identifying foliated plants.

## Identifying Characteristics of Plants

In this portion of the chapter you will review features and terminology of the following characteristics of plants:

- Leaf Blade
- Leaf Arrangement
- Leaf Margins
- Leaf Form
- Leaf Shapes
- Leaf Apices
- Leaf Bases
- Types of Venation
- Winter Twig Characteristics
- Bud Shape
- Terminal Bud
- Bundle Scars
- Shape of Leaf Scars
- Flower

Perhaps the easiest way to identify plants during the growing season is by looking at the leaves. Leaf arrangement, leaf characters, type, shape and presence/absence of petioles and/or hairs or wax are all key elements used in identifying foliated plants.

### Leaf Type:

A **simple leaf** is a single leaf that is never divided into smaller leaflet units. It is always attached to a twig by its stem or the petiole.

A **compound leaf** consists of several or many distinct parts (leaflets) joined to a single stem.

A **double compound** (bipinnate) leaf is one in which each leaflet of a compound leaf is also made up of secondary leaflets. (Figure 1)

Several publications have been included describing characteristics and cultural requirements of some recommended urban trees, conifers, and shrubs.

Three of note are;

1. *Recommended Trees for Urban Situations*
2. *Recommended Conifers for Urban Sites*
3. *Shrubs for Difficult Sites*

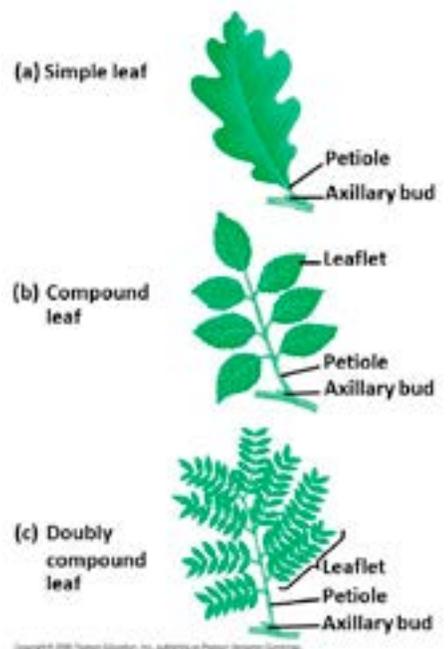


Figure 1 Leaf Types

### *Leaf Arrangement:*

**Opposite** - Leaves and buds are opposite each other on the stem.

**Sub Opposite** - The buds are offset slightly so not to be considered opposite, but not far enough from each other to be considered alternate.

**Alternate** - leaves and buds alternate along the stem.

**Whorled** - three buds and leaves occur at a node.

(Figure 2)

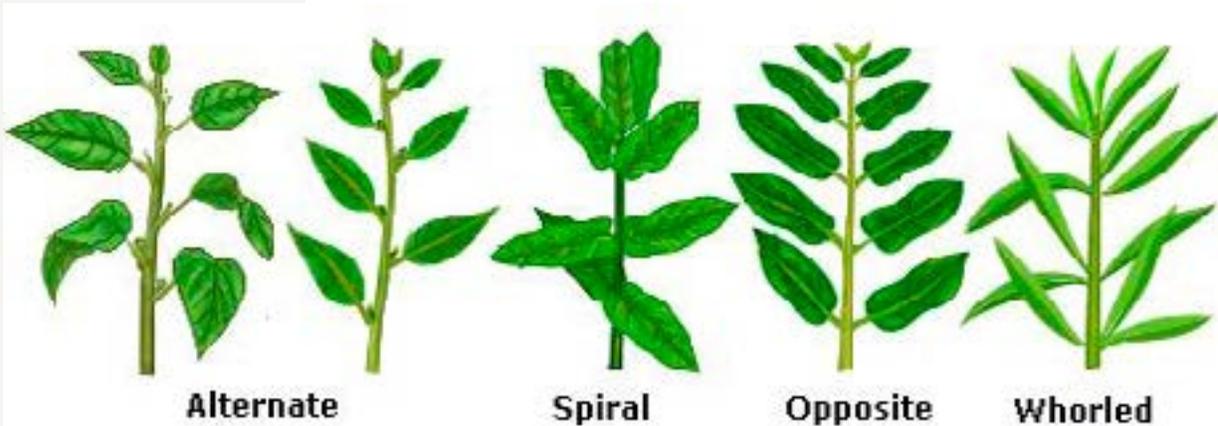


Figure 2

### *Leaf Apices: (the tip of the leaf)* (Figure 3)

**Acuminate** - tip more or less in a tapering point

**Acute** - forming a sharp angle

**Obtuse** - blunt and rounded

**Truncate** - ending abruptly as if cut off

**Emarginate** - deep indentation

**Retuse** - shallow narrow indentation at tip

**Cordate** - heart shaped

**Obcordate** - reverse heart shaped

**Cuspidate** - tipped with a sharp, rigid point

**Micronate** - tipped with a short point which is not sharp

### *Leaf Bases: (the bottom of the leaf)* (Figure 4)

**Acuminate** - wedge shaped, tapering to a very acute base

**Acute** - forming a wedge-shaped, sharp angle, pointing away from the apex

**Rounded** - full, sweeping arc

**Cordate** - heart shaped

**Oblique** - base offset at midrib

**Sagittate** - arrowhead shaped

**Hastate** - flaring lobes at base

# SHAPE & ARRANGEMENT

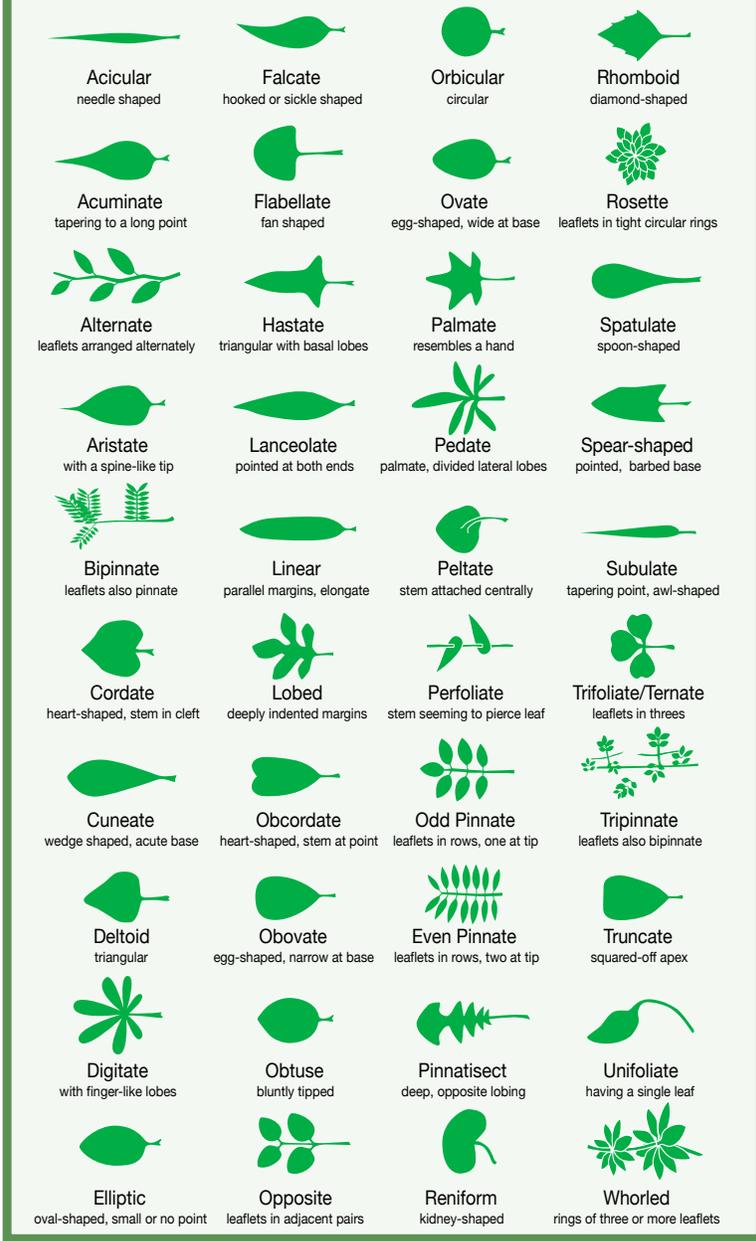


Figure 3

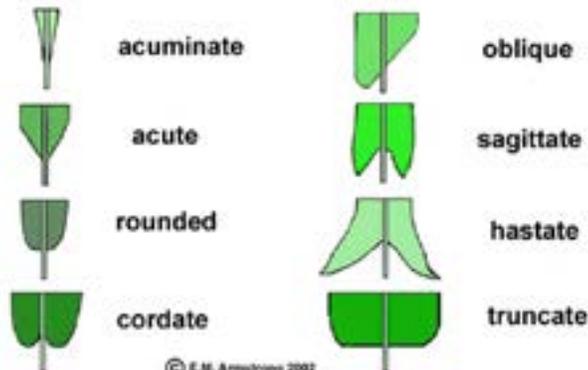
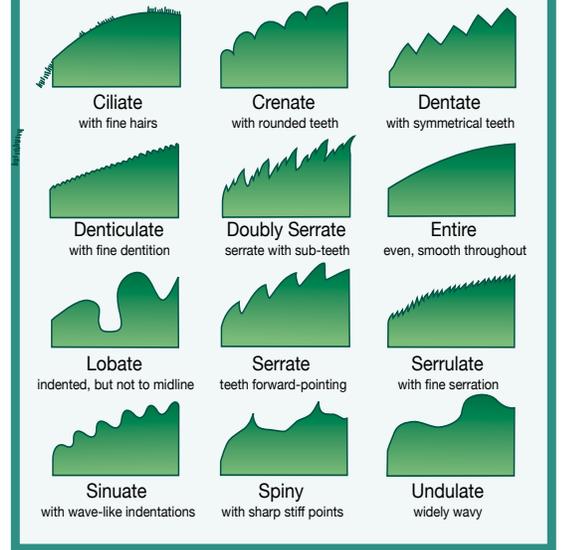


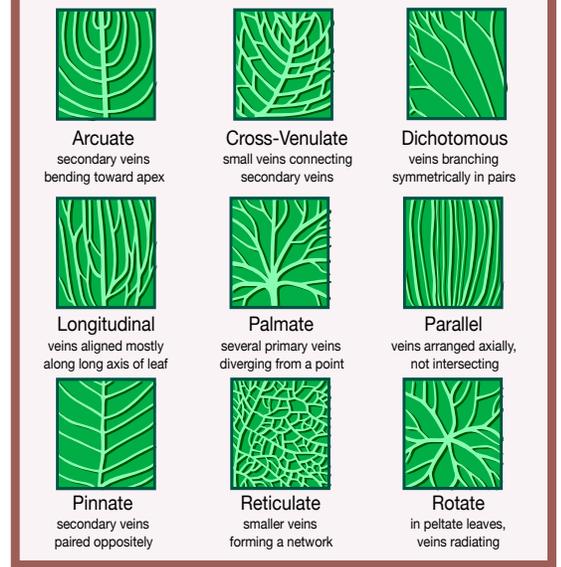
Figure 4

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# MARGIN



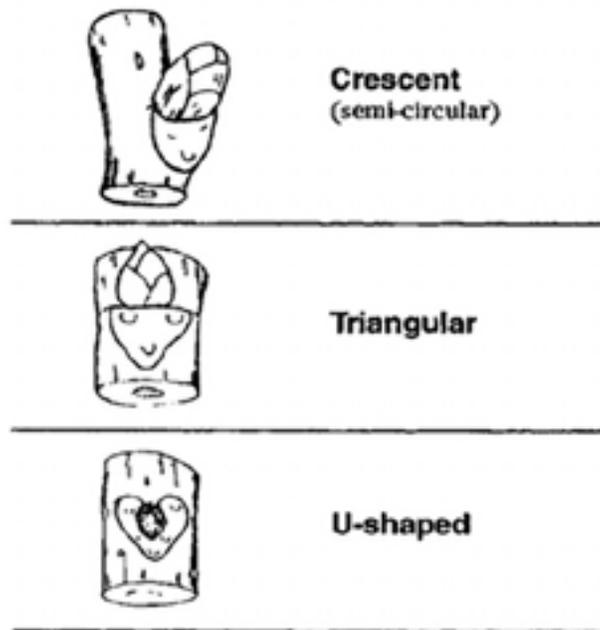
# VENATION



### Shapes of Leaf Scars:

(The leaf scar is found at the point where the petiole is attached to the stem.)

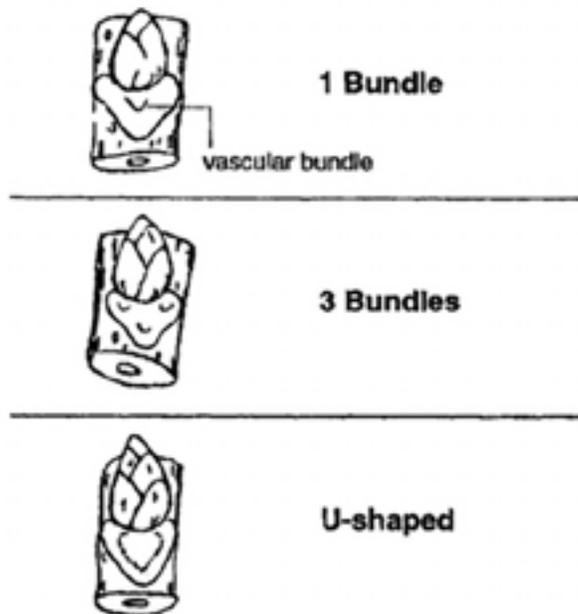
(Figure 5)



### Bundle Scars:

(Formed from the vascular connection between the petiole and stem.)

(Figure 6)



## Flowers:

A flower is the specialized reproductive structure of angiosperms. Flowers develop into many forms and sizes. The parts of a typical angiosperm are as follows:

**Complete Flower** - A flower with all the parts: sepals, petals, stamens and pistils.

**Incomplete Flower** - A flower that lacks one or more of the following: sepals, petals, stamens or pistils.

**Perfect** - A flower having both stamens and pistils.

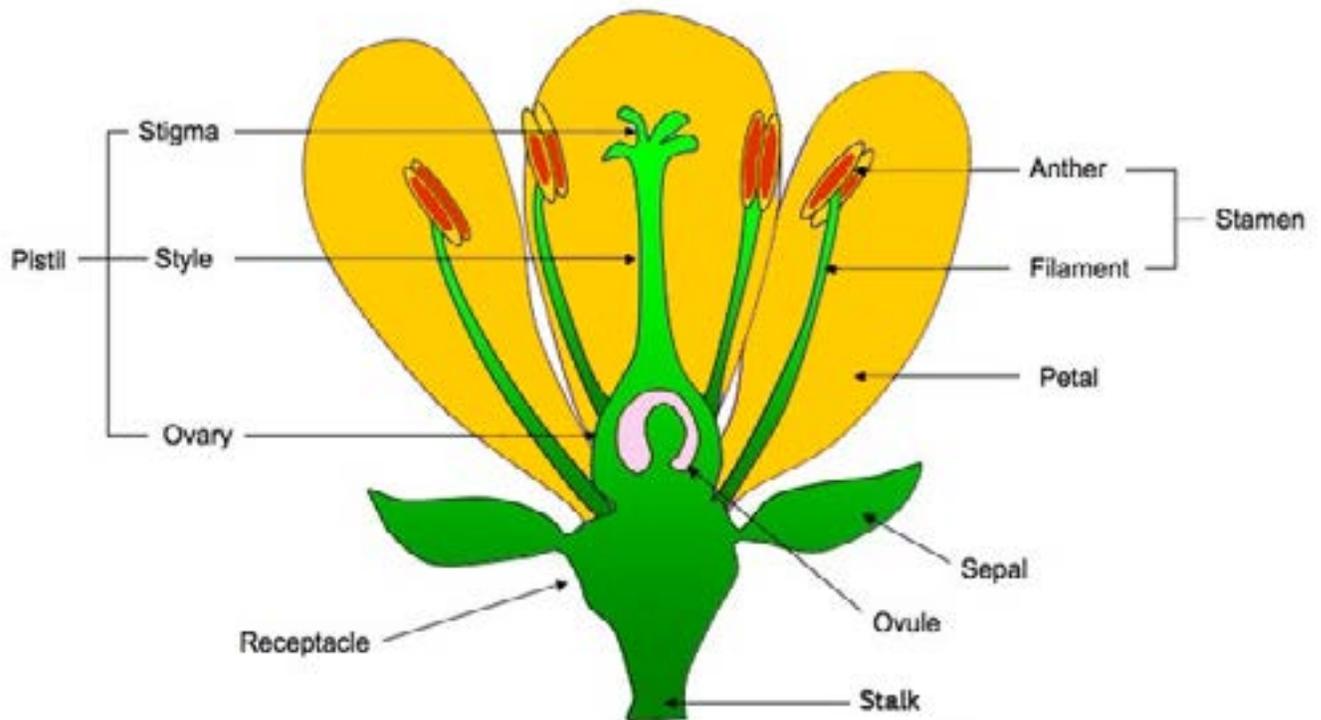
**Imperfect** - A flower which lacks either stamens or carpels.

**Monoecious** - A plant with separate male and female reproductive structures occurring on the same plant. In angiosperms, having unisexual flowers of different sexes on the same plant.

**Dioecious** - Having staminate and pistillate flowers on different plants of the same species; thus dioecious plants have imperfect and unisexual flowers.

**Polygamous** - Plants bearing both perfect and imperfect flowers

(Figure 7)



Parts of a flower

### Types of Inflorescences:

(Figure 8)

**Solitary** - Flower borne singly

**Spike** - An unbranched, indeterminate, elongated inflorescence which bears sessile flowers

**Raceme** - An unbranched, indeterminate inflorescence, in which the individual flowers are borne on pedicels along the main axis

**Panicle** - An indeterminate inflorescence, the main axis of which is branched, with flowers borne upon the secondary branches

**Corymb** - A flat-topped or convex, indeterminate, racemose inflorescence, the lower or outward pedicels longer, their flowers opening first

**Head** - A dense inflorescence or sessile or nearly sessile flowers on a compound receptacle

**Umbel** - A determinate or indeterminate flat-topped convex inflorescence in which these pedicels all arise from the apex of the peduncle

**Catkin** - A type of spike found only in woody plants

**Spadix** - A spike borne on a succulent axis enveloped by a spathe

**Cyme** - flower cluster with a central stem bearing a single terminal flower that develops first

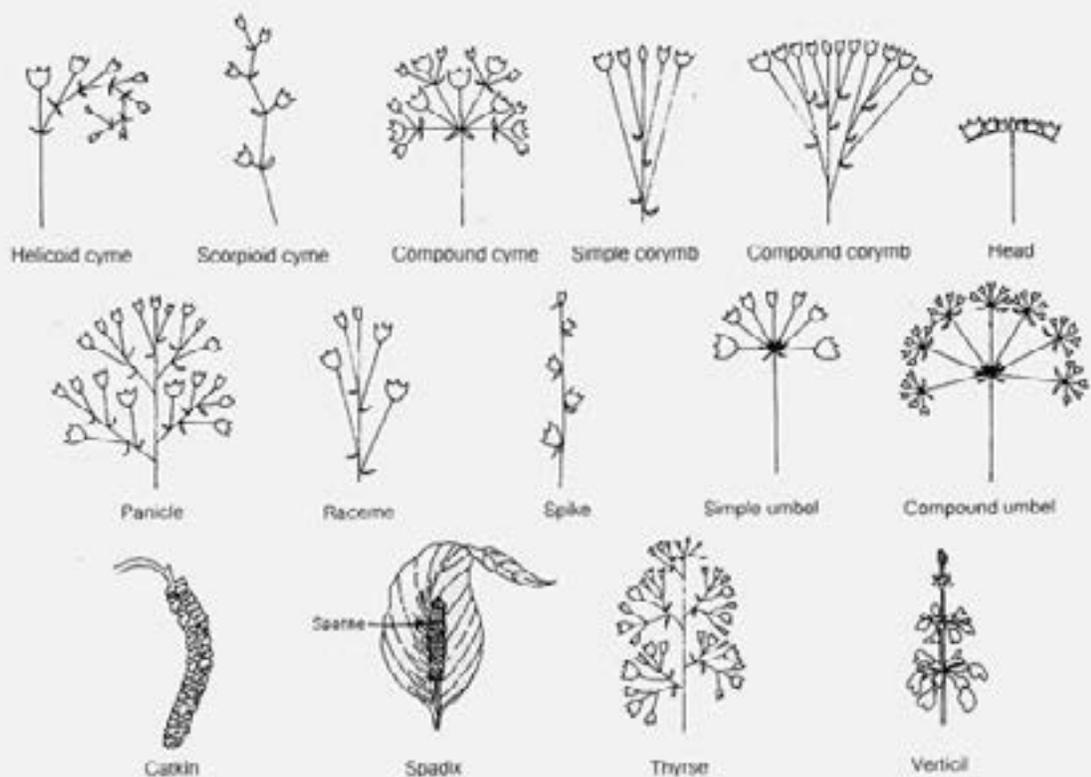


Figure 8

### Recommended Urban Trees

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by Dr. Nina Bassuk, Urban Horticulture Institute, Cornell University

This list is designed to help you choose the most appropriate tree for any given urban situation. There is no one perfect tree! The most successful course is to match the planting site limitations with the right tree for that spot. Diversity is one of the keys to a successful tree planting program. By seeking to plant the perfect urban tree over and over again, we set ourselves up for disaster in the future. Over-planting one type of tree results in a monoculture which often encourages the build-up of insect populations or diseases that can destroy an entire planting. Even when a tree has been enormously successful as a street tree, as was the American elm, the introduction of Dutch Elm Disease caused the rapid death of these trees exacerbated by uniform, non-diversified urban planting.

I believe a reasonable goal for most urban plantings is to place a 5% limit on any species within the total municipal tree population. Therefore, if a disease or insect infestation should occur, 95% of a tree population would remain intact. Unfortunately, in most urban areas, perhaps only five or fewer species make up the great majority of trees planted.

If there is no one perfect urban tree, it is also important to understand that there is no one urban environment. The urban environment is a varied conglomeration of microclimates. The above ground or below ground site conditions can change dramatically within the space of a few feet.

### Assess Your Site

This list of recommended trees will only accomplish half of the task of choosing an appropriate tree unless a reasonable site assessment can be accomplished prior to selection.

#### *Below Ground:*

#### **Restricted Rooting Space**

Underground obstacles, compaction near curbs and driveways and actual containerization of trees causes

restricted rooting space limiting the amount of water, nutrients and O<sub>2</sub> the roots have access to. Drought tolerant trees offer some hope; however, reasonable rooting space should be allowed before trees are planted.

### **Soil Texture**

A sandy soil will suffer less from the effects of compaction but may be less able to supply water to the trees. Conversely, a heavy clay soil may be too wet due to compaction so that oxygen is unavailable.

### **Soil pH**

Most urban soils have a high pH (nearer to neutral or higher) due to limestone containing materials in the street environment. A simple pH test can determine your site's characteristics.

### **Drainage**

Poor drainage due to compaction or underground obstacles can easily be judged by placing an open ended coffee can on top of the soil, pouring water in and observing the time it takes to drain. If the water hasn't drained in an hour you may want to put in supplemental drains or choose species that can tolerate intermittent flooding.

### **Road Salt**

In an area of high road salt or sidewalk salt applications, appropriate species can be planted to minimize damage later on.

## *Above Ground*

### **Exposure**

Excessively windy sites will often place stress on trees with large leaves leading to leaf tatter. Also, trees in these sites may need supplemental watering so they do not dry out as quickly.

Shady sites determined by the sun and shade patterns around buildings, may limit the choice of trees. Most trees require full sun, but a few may tolerate slightly lower levels.

### **Building Set-Back/Overhead Wires**

The presence of physical barriers to tree growth above ground such as a narrow building set back from the street and/or overhead high tension wires requires a tree which will not interfere with these structures. Columnar forms or

trees with low mature heights (<301) can be used in these situations.

### **Surrounding Building Surfaces**

Concrete, asphalt, car tops, mirrored building surfaces etc. increase the reflected and reradiated heat load onto a tree which can cause it to heat up and lose water from its leaves at a faster rate than normal. Drought resistant trees should be chosen in these situations.

### **USDA Temperature Zones**

**(See map on last page of this chapter.)** All trees chosen for your planting area should be cold hardy. Urban environments often fluctuate more in temperature due to heat from buildings and sheltering from wind. A good rule is to plant trees that conform to your zone or lower (colder) climates. Trees in containers are more susceptible to cold winter temperatures than trees in the ground.

### *Choose Your Tree*

After assessing your site and choosing your tree, be careful to pay attention to good planting techniques including planting during the proper time of year.

### **How reliable is the information?**

This information in this list has been gleaned from many sources including *Street Trees for Metropolitan New York* by Paul Berrang and David Karnosky, *Landscape Plants for Eastern North America* by Harrison Flint, *Manual of Woody Landscape Plants* by Michael Dirr and the Proceedings of the Metropolitan Tree Improvement Alliance (METRIA).

Numerous nurserymen, city foresters and arborists as well as nursery catalogs were also consulted. Furthermore, our observations and research at the Urban Horticulture Institute at Cornell University figured prominently in the final product. Nevertheless, the given information is subject to regional variation and interpretation.

Observe trees in your area before planting to see if there are any species which are doing particularly well or poorly. Also important to note is that the tolerance of the trees described by the list refers to trees which have become established in the landscape. All trees when newly transplanted are much more prone to damage from environmental stress. There is no substitute for adequate tree maintenance.

The source of this section is the [Cornell University WOODY PLANTS DATABASE](#).

This comprehensive, searchable database is an essential tool. It allows you to search by Name or various Characteristics.

Clicking on the *Botanical Name* of the trees below will link you to the database page for more information.

## Small trees (less than 30') suitable for city environment plantings under low overhead utility wires or in restricted spaces

	Botanical Name	Common Name	Summary
	<i>Acer buergerianum</i>	Trident Maple	Tree < 30 feet, Deciduous, Full sun, Zone 6a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Acer campestre</i>	Hedge Maple	Tree < 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Acer miyabei</i>	Miyabe Maple	Tree < 30 feet, Deciduous, Full sun, Part shade, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Acer saccharum</i>	Sugar Maple; Rock Maple; Hard Maple	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0) <i>NOTE:</i> under optimal conditions, this tree can exceed 30'.

	<i>Acer tataricum ssp. ginnala</i>	Amur Maple	Tree < 30 feet, Deciduous, Full sun, Part shade, Zone 3a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Amelanchier spp.</i>	Serviceberry; Shadblow	Tree < 30 feet, Deciduous, Full sun, Part shade, Zone 3b, Can tolerate acid to neutral soil (pH 5.0 to 7.4)
	<i>Betula nigra</i>	River Birch; Red Birch	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty. <i>NOTE:</i> under optimal conditions, tree can exceed 30'.
	<i>Carpinus caroliniana</i>	American Hornbeam; Blue Beech; Ironwood; Musclewood	Tree < 30 feet, Deciduous, Part shade, Zone 3b, Can tolerate acid to neutral soil (pH 5.0 to 7.4)
	<i>Cercis canadensis</i>	Eastern Redbud	Tree < 30 feet, Shrub > 8 feet, Deciduous, Full sun, Part shade, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Cornus mas</i>	Corneliancherry Dogwood; Cornelian Cherry	Tree < 30 feet, Deciduous, Full sun, Part shade, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Cotinus obovatus</i>	American Smoketree	Tree < 30 feet, Shrub > 8 feet, Deciduous, Full sun, Zone 5b

	<p><i>Crataegus crus-galli</i></p>	<p>Cockspur Hawthorn</p>	<p>Tree &lt; 30 feet, Deciduous, Full sun, Zone 4a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>
	<p><i>Crataegus phaenopyrum</i></p>	<p>Washington Hawthorn</p>	<p>Tree &lt; 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>
	<p><i>Crataegus viridis</i> 'Winter King'</p>	<p>Winter King Hawthorn</p>	<p>Tree &lt; 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>
	<p><i>Gleditsia triacanthos</i></p>	<p>Common Honeylocust; Honey Locust</p>	<p>Tree &gt; 30 feet, Tree &lt; 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>
	<p><i>Koelreuteria paniculata</i></p>	<p>Golden-rain Tree; Varnish Tree</p>	<p>Tree &lt; 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>
	<p><i>Maackia amurensis</i></p>	<p>Amur Maackia</p>	<p>Tree &lt; 30 feet, Deciduous, Full sun, Zone 4a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>

	<i>Malus spp.</i>	Flowering Crabapple	Tree < 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Ostrya virginiana</i>	Hop Hornbeam	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Part shade, Zone 3b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Parrotia persica</i>	Persian Parrotia	Tree < 30 feet, Deciduous, Full sun, Part shade, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Prunus 'Accolade'</i>	Flowering Cherry 'Accolade'	Tree < 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salt spray
	<i>Prunus virginiana</i>	Chokecherry	Tree < 30 feet, Deciduous, Full sun, Zone 3a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Prunus 'Snow Goose'</i>	Snow Goose Cherry	Tree < 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)

	<p><i>Robinia pseudoacacia</i></p>	<p>Black Locust</p>	<p>Tree &gt; 30 feet, Tree &lt; 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salt  <b>NOTE:</b> under optimal conditions, can exceed 30'.</p>
	<p><i>Sorbus alnifolia</i></p>	<p>Korean Mountain Ash</p>	<p>Tree &lt; 30 feet, Deciduous, Full sun, Part shade, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)  <b>NOTE:</b> under optimal conditions, can exceed 30'.</p>
	<p><i>Syringa reticulata</i></p>	<p>Japanese Tree Lilac</p>	<p>Tree &lt; 30 feet, Deciduous, Full sun, Zone 3a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>
	<p><i>Zelkova serrata</i></p>	<p>Japanese Zelkova; Saw-leaf Zelkova; Keaki Tree</p>	<p>Tree &gt; 30 feet, Tree &lt; 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)  <b>NOTE:</b> under optimal conditions, can exceed 30'.</p>

**Medium to large trees (greater than 30')  
suitable for city environment plantings**

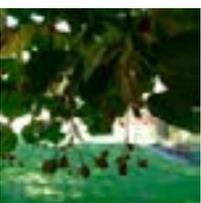
	Botanical Name	Common Name	Summary
	<i>Acer rubrum</i>	Red Maple; Scarlet Maple; Swamp Maple	Tree > 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to neutral soil (pH 5.0 to 7.4)
	<i>Acer saccharum</i>	Sugar Maple; Rock Maple; Hard Maple	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Acer x freemanii</i>	Freeman Maple	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to neutral soil (pH 5.0 to 7.4)
	<i>Betula nigra</i>	River Birch; Red Birch	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty soil
	<i>Betula populifolia</i>	Gray Birch; Poplar Birch; Old Field Birch; Poverty Birch; White Birch	Tree > 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to neutral soil (pH 5.0 to 7.4)
	<i>Carpinus betulus</i>	European Hornbeam	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)

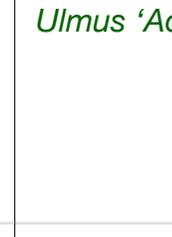
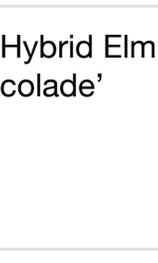
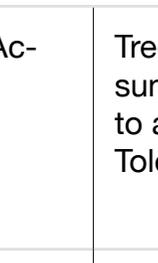
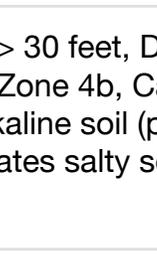
	<i>Catalpa speciosa</i>	Catalpa; Indian Bean	Tree > 30 feet, Deciduous, Full sun, Part shade, Zone 4a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Celtis occidentalis</i>	Hackberry; Sugarberry	Tree > 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Cercidiphyllum japonicum</i>	Katsuratree; Katsura Tree	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Cladrastis kentukea</i>	Yellowwood	Tree > 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Corylus colurna</i>	Turkish Filbert; Turkish Hazel	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Eucommia ulmoides</i>	Hardy Rubber Tree	Tree > 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Ginkgo biloba</i>	Ginkgo; Maidenhair Tree	Tree > 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil

	<i>Gleditsia triacanthos</i>	Common Honeylocust; Honey Locust	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Gymnocladus dioicus</i>	Kentucky Coffee-tree	Tree > 30 feet, Deciduous, Full sun, Zone 4a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Liquidambar styraciflua</i>	American Sweetgum	Tree > 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to neutral soil (pH 5.0 to 7.4)
	<i>Liriodendron tulipifera</i>	Tuliptree; Tulip Poplar; Tulip Magnolia; Yellow Poplar; White-wood	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Maclura pomifera</i>	Osage Orange; Boxwood	Tree > 30 feet, Deciduous, Full sun, Zone 4a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salt spray
	<i>Metasequoia glyptostroboides</i>	Dawn Redwood	Tree > 30 feet, Deciduous, Full sun, Part shade, Zone 5b, Can tolerate acid to neutral soil (pH 5.0 to 7.4)
	<i>Nyssa sylvatica</i>	Pepperidge; Sour Gum; Black Gum; Tupelo	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty soil

	<i>Ostrya virginiana</i>	Hop Hornbeam	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Part shade, Zone 3b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Platanus x acerifolia</i>	London Planetree	Tree > 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Prunus sargentii</i>	Sargent Cherry	Tree > 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty soil
	<i>Pyrus calleryana</i>	Callery Pear	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Quercus acutissima</i>	Saw-tooth Oak	Tree > 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty soil
	<i>Quercus bicolor</i>	Swamp White Oak	Tree > 30 feet, Deciduous, Full sun, Zone 4a, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty soil
	<i>Quercus coccinea</i>	Scarlet Oak	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to neutral soil (pH 5.0 to 7.4)

	<i>Quercus imbricaria</i>	Shingle Oak	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)
	<i>Quercus macrocarpa</i>	Bur Oak; Mossycup Oak	Tree > 30 feet, Deciduous, Full sun, Zone 3a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Quercus muehlenbergii</i>	Chinkapin Oak	Tree > 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Quercus palustris</i>	Pin Oak; Swamp Oak	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Requires acid (pH 5.0 to 7.0)
	<i>Quercus phellos</i>	Willow Oak	Tree > 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty soil
	<i>Quercus robur</i>	English Oak; Truffle Oak; Pedunculate Oak	Tree > 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Quercus rubra</i>	Red Oak; Northern Red Oak	Tree > 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to neutral soil (pH 5.0 to 7.4), Tolerates salty soil

	<p><i>Quercus shumardii</i></p>	<p>Shumard Oak</p>	<p>Tree &gt; 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to neutral soil (pH 5.0 to 7.4)</p>
	<p><i>Styphnolobium japonicum</i></p>	<p>Japanese Pagoda Tree; Scholar-Tree</p>	<p>Tree &gt; 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil</p>
	<p><i>Taxodium distichum</i></p>	<p>Bald Cypress</p>	<p>Tree &gt; 30 feet, Deciduous, Full sun, Zone 5b, Requires acid (pH 5.0 to 7.0), Tolerates salt spray, Tolerates salty soil</p>
	<p><i>Tilia americana</i></p>	<p>American Linden; Basswood</p>	<p>Tree &gt; 30 feet, Deciduous, Full sun, Zone 3a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)</p>
	<p><i>Tilia cordata</i></p>	<p>Littleleaf Linden; Small-leaved Lime</p>	<p>Tree &gt; 30 feet, Deciduous, Full sun, Zone 3b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)</p>
	<p><i>Tilia tomentosa</i></p>	<p>Silver Linden</p>	<p>Tree &gt; 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)</p>
	<p><i>Tilia x euchlora</i></p>	<p>Crimean Linden</p>	<p>Tree &gt; 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)</p>

	<i>Ulmus 'Accolade'</i>	Hybrid Elm 'Accolade'	Tree > 30 feet, Deciduous, Full sun, Zone 4b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Ulmus 'Frontier'</i>	Hybrid Elm 'Frontier'	Tree > 30 feet, Deciduous, Full sun, Zone 5a, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Ulmus americana</i>	American Elm	Tree > 30 feet, Deciduous, Full sun, Zone 3a, Tolerates salty soil
	<i>Ulmus parvifolia</i>	Chinese Elm; Lacebark Elm	Tree > 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Ulmus spp.</i>	Hybrid Elms and other species	Tree > 30 feet, Deciduous, Full sun, Zone , Can tolerate acid to alkaline soil (pH 5.0 to 8.0), Tolerates salty soil
	<i>Zelkova serrata</i>	Japanese Zelkova; Saw-leaf Zelkova; Keaki Tree	Tree > 30 feet, Tree < 30 feet, Deciduous, Full sun, Zone 5b, Can tolerate acid to alkaline soil (pH 5.0 to 8.0)

## Trees Grouped by Site or Planting Conditions

### Soil pH Chart

**pH:** Most urban soils have a higher pH (from near neutral to alkaline) than surrounding rural areas due to limestone-containing materials in the street environment. A simple pH test can determine your site's characteristics. Trees that require acid soil with a pH of 5.0-7.0 are listed as **< 7.0**. Trees that can tolerate acid to neutral soil with a pH of 5.0-7.5 are listed as **< 7.5**. Trees that can tolerate acid to alkaline soil with a pH of 5.0-8.2 are listed as **< 8.2**.

#### Requires acid (pH 5.0 to 7.0)

<b>Botanical Name</b>	<b>Common Name</b>
<i>Quercus palustris</i>	Pin Oak; Swamp Oak
<i>Taxodium distichum</i>	Bald Cypress

#### Can tolerate acid to neutral soil (pH 5.0 to 7.4)

<b>Botanical Name</b>	<b>Common Name</b>
<i>Acer rubrum</i>	Red Maple; Scarlet Maple; Swamp Maple
<i>Acer x freemanii</i>	Freeman Maple
<i>Amelanchier spp.</i>	Serviceberry; Shadblow
<i>Betula nigra</i>	River Birch; Red Birch
<i>Betula populifolia</i>	Gray Birch; Poplar Birch; White Birch
<i>Carpinus caroliniana</i>	American Hornbeam; Blue Beech; Ironwood; Muscledwood
<i>Liquidambar styraciflua</i>	American Sweetgum
<i>Metasequoia glyptostroboides</i>	Dawn Redwood
<i>Nyssa sylvatica</i>	Pepperidge; Sour Gum; Black Gum; Tupelo
<i>Prunus 'Accolade'</i>	Flowering Cherry 'Accolade'
<i>Prunus sargentii</i>	Sargent Cherry
<i>Quercus acutissima</i>	Saw-tooth Oak
<i>Quercus bicolor</i>	Swamp White Oak
<i>Quercus coccinea</i>	Scarlet Oak
<i>Quercus phellos</i>	Willow Oak
<i>Quercus rubra</i>	Red Oak; Northern Red Oak
<i>Quercus shumardii</i>	Shumard Oak

## Can tolerate acid to alkaline soil (pH 5.0 to 8.0)

<b>Botanical Name</b>	<b>Common Name</b>
<i>Acer buergerianum</i>	Trident Maple
<i>Acer campestre</i>	Hedge Maple
<i>Acer miyabei</i>	Miyabe Maple
<i>Acer saccharum</i>	Sugar Maple; Rock Maple; Hard Maple
<i>Acer tataricum ssp. ginnala</i>	Amur Maple
<i>Carpinus betulus</i>	European Hornbeam
<i>Catalpa speciosa</i>	Catalpa; Indian Bean
<i>Celtis occidentalis</i>	Hackberry; Sugarberry
<i>Cercidiphyllum japonicum</i>	Katsuratree; Katsura Tree
<i>Cercis canadensis</i>	Eastern Redbud
<i>Cladrastis kentukea</i>	Yellowwood
<i>Cornus mas</i>	Corneliancherry Dogwood; Cornelian Cherry
<i>Corylus colurna</i>	Turkish Filbert; Turkish Hazel
<i>Crataegus crus-galli</i>	Cockspur Hawthorn
<i>Crataegus phaenopyrum</i>	Washington Hawthorn
<i>Crataegus viridis</i> 'Winter King'	Winter King Hawthorn
<i>Eucommia ulmoides</i>	Hardy Rubber Tree
<i>Ginkgo biloba</i>	Ginkgo; Maidenhair Tree
<i>Gleditsia triacanthos</i>	Common Honeylocust; Honey Locust
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Koelreuteria paniculata</i>	Golden-rain Tree; Varnish Tree
<i>Liriodendron tulipifera</i>	Tuliptree; Tulip Poplar; Tulip Magnolia; Yellow Poplar; Whitewood
<i>Maackia amurensis</i>	Amur Maackia
<i>Maclura pomifera</i>	Osage Orange; Boxwood
<i>Malus spp.</i>	Flowering Crabapple
<i>Ostrya virginiana</i>	Hop Hornbeam
<i>Parrotia persica</i>	Persian Parrotia

<i>Phellodendron amurense</i>	Amur Cork Tree
<i>Platanus x acerifolia</i>	London Planetree
<i>Prunus virginiana</i>	Chokecherry
<i>Prunus</i> ‘Snow Goose’	Snow Goose Cherry
<i>Pyrus calleryana</i>	Callery Pear
<i>Quercus imbricaria</i>	Shingle Oak
<i>Quercus macrocarpa</i>	Bur Oak; Mossycup Oak
<i>Quercus muehlenbergii</i>	Chinkapin Oak
<i>Quercus robur</i>	English Oak; Truffle Oak; Pedunculate Oak
<i>Robinia pseudoacacia</i>	Black Locust
<i>Sorbus alnifolia</i>	Korean Mountain Ash
<i>Styphnolobium japonicum</i>	Japanese Pagoda Tree; Scholar-Tree
<i>Syringa reticulata</i>	Japanese Tree Lilac
<i>Tilia americana</i>	American Linden; Basswood
<i>Tilia cordata</i>	Littleleaf Linden; Small-leaved Lime
<i>Tilia tomentosa</i>	Silver Linden
<i>Tilia x euchlora</i>	Crimean Linden
<i>Ulmus</i> ‘Accolade’	Hybrid Elm ‘Accolade’
<i>Ulmus</i> ‘Frontier’	Hybrid Elm ‘Frontier’
<i>Ulmus parvifolia</i>	Chinese Elm; Lacebark Elm
<i>Ulmus</i> spp.	Hybrid Elms and other species
<i>Zelkova serrata</i>	Japanese Zelkova; Saw-leaf Zelkova; Keaki Tree

### Trees That Tolerate Partial Shade

**Sun/Shade:** Most trees require full sun, although some will tolerate the lower light levels of partial shade and a small few will tolerate full shade. Full sun plants require more than 6 hours of direct sunlight a day. Partial shade plants tolerate direct sun for less than 6 hours a day, or filtered light for most of the day. Full shade plants tolerate little or no direct sunlight, or less than 6 hours of filtered sunlight a day.

<b>Botanical Name</b>	<b>Common Name</b>
<i>Acer miyabei</i>	Miyabe Maple
<i>Acer tataricum ssp. ginnala</i>	Amur Maple
<i>Amelanchier spp.</i>	Serviceberry; Shadblow
<i>Carpinus caroliniana</i>	American Hornbeam; Blue Beech; Ironwood; Musclewood
<i>Catalpa speciosa</i>	Catalpa; Indian Bean
<i>Cercis canadensis</i>	Eastern Redbud
<i>Cornus mas</i>	Corneliancherry Dogwood; Cornelian Cherry
<i>Metasequoia glyptostroboides</i>	Dawn Redwood
<i>Ostrya virginiana</i>	Hop Hornbeam
<i>Parrotia persica</i>	Persian Parrotia
<i>Sorbus alnifolia</i>	Korean Mountain Ash

### Trees Observed to Have Some Salt Tolerance

**Salt:** Salt can impact trees in two ways: as salt spray and as salt in the soil. There is only anecdotal information about salt tolerance in trees, much of which doesn't differentiate between spray and soil. *This section is referencing only the plant's observed tolerance or sensitivity to salt in the soil.* Salt spray can be more obviously damaging to plant stems and buds. Soil salt may be leached away before active growth begins in spring. However, salt applied during an early snowfall (late October or early November) may also damage trees, as will a late salt application (April) because soil temperatures are warmer and roots are more active. Heavy salt applications are always damaging regardless of reported tolerance. In areas where high levels of road salt or sidewalk salts are used, trying to choose species that have some observed tolerance and avoiding the sensitive ones may minimize damage later.

<b>Botanical Name</b>	<b>Common Name</b>
<i>Acer buergerianum</i>	Trident Maple
<i>Acer tataricum ssp. ginnala</i>	Amur Maple
<i>Betula nigra</i>	River Birch; Red Birch
<i>Celtis occidentalis</i>	Hackberry; Sugarberry
<i>Crataegus crus-galli</i>	Cockspur Hawthorn
<i>Crataegus phaenopyrum</i>	Washington Hawthorn
<i>Crataegus viridis 'Winter King'</i>	Winter King Hawthorn
<i>Eucommia ulmoides</i>	Hardy Rubber Tree
<i>Ginkgo biloba</i>	Ginkgo; Maidenhair Tree
<i>Gleditsia triacanthos</i>	Common Honeylocust; Honey Locust
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Koelreuteria paniculata</i>	Golden-rain Tree; Varnish Tree
<i>Maackia amurensis</i>	Amur Maackia
<i>Maclura pomifera</i>	Osage Orange; Boxwood
<i>Malus spp.</i>	Flowering Crabapple
<i>Nyssa sylvatica</i>	Pepperidge; Sour Gum; Black Gum; Tupelo

<i>Prunus 'Accolade'</i>	Flowering Cherry 'Accolade'
<i>Prunus sargentii</i>	Sargent Cherry
<i>Pyrus calleryana</i>	Callery Pear
<i>Quercus acutissima</i>	Saw-tooth Oak
<i>Quercus bicolor</i>	Swamp White Oak
<i>Quercus macrocarpa</i>	Bur Oak; Mossycup Oak
<i>Quercus muehlenbergii</i>	Chinkapin Oak
<i>Quercus phellos</i>	Willow Oak
<i>Quercus robur</i>	English Oak; Truffle Oak; Pedunculate Oak
<i>Quercus rubra</i>	Red Oak; Northern Red Oak
<i>Robinia pseudoacacia</i>	Black Locust
<i>Styphnolobium japonicum</i>	Japanese Pagoda Tree; Scholar-Tree
<i>Syringa reticulata</i>	Japanese Tree Lilac
<i>Taxodium distichum</i>	Bald Cypress
<i>Ulmus 'Accolade'</i>	Hybrid Elm 'Accolade'
<i>Ulmus 'Frontier'</i>	Hybrid Elm 'Frontier'
<i>Ulmus americana</i>	American Elm
<i>Ulmus parvifolia</i>	Chinese Elm; Lacebark Elm
<i>Ulmus spp.</i>	Hybrid Elms and other species

### Trees Suitable for Use in CU-Structural Soil™

The basis for plant selection for structural soils should aim toward alkaline-tolerant and drought tolerant plant species. The stone used, whether limestone or granite, or other aggregates, will heavily influence soil pH. Structural soils made with limestone generally end up with a soil pH of about 8.0, regardless of the soil pH when the material was first mixed. Using structural soil aggregates that do not influence pH, such as granite may not affect pH as quickly, but the pH will continue to climb as the concrete slowly breaks down.

<b>Botanical Name</b>	<b>Common Name</b>
<i>Acer campestre</i>	Hedge Maple
<i>Acer miyabei</i>	Miyabe Maple
<i>Carpinus betulus</i>	European Hornbeam
<i>Catalpa speciosa</i>	Catalpa; Indian Bean
<i>Celtis occidentalis</i>	Hackberry; Sugarberry
<i>Cercis canadensis</i>	Eastern Redbud
<i>Cornus mas</i>	Corneliancherry Dogwood; Cornelian Cherry
<i>Corylus colurna</i>	Turkish Filbert; Turkish Hazel
<i>Cotinus obovatus</i>	American Smoketree
<i>Crataegus crus-galli</i>	Cockspur Hawthorn
<i>Crataegus phaenopyrum</i>	Washington Hawthorn
<i>Crataegus viridis</i> ‘Winter King’	Winter King Hawthorn
<i>Eucommia ulmoides</i>	Hardy Rubber Tree
<i>Ginkgo biloba</i>	Ginkgo; Maidenhair Tree
<i>Gleditsia triacanthos</i>	Common Honeylocust; Honey Locust
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Koelreuteria paniculata</i>	Golden-rain Tree; Varnish Tree
<i>Maackia amurensis</i>	Amur Maackia
<i>Maclura pomifera</i>	Osage Orange; Boxwood

<i>Malus spp.</i>	Flowering Crabapple
<i>Parrotia persica</i>	Persian Parrotia
<i>Phellodendron amurense</i>	Amur Cork Tree
<i>Platanus x acerifolia</i>	London Planetree
<i>Pyrus calleryana</i>	Callery Pear
<i>Quercus bicolor</i>	Swamp White Oak
<i>Quercus macrocarpa</i>	Bur Oak; Mossycup Oak
<i>Quercus muehlenbergii</i>	Chinkapin Oak
<i>Quercus robur</i>	English Oak; Truffle Oak; Pedunculate Oak
<i>Robinia pseudoacacia</i>	Black Locust
<i>Sorbus alnifolia</i>	Korean Mountain Ash
<i>Styphnolobium japonicum</i>	Japanese Pagoda Tree; Scholar-Tree
<i>Syringa reticulata</i>	Japanese Tree Lilac
<i>Tilia americana</i>	American Linden; Basswood
<i>Tilia cordata</i>	Littleleaf Linden; Small-leaved Lime
<i>Tilia tomentosa</i>	Silver Linden
<i>Tilia x euchlora</i>	Crimean Linden
<i>Ulmus 'Accolade'</i>	Hybrid Elm 'Accolade'
<i>Ulmus 'Frontier'</i>	Hybrid Elm 'Frontier'
<i>Ulmus americana</i>	American Elm
<i>Ulmus parvifolia</i>	Chinese Elm; Lacebark Elm
<i>Ulmus spp.</i>	Hybrid Elms and other species
<i>Zelkova serrata</i>	Japanese Zelkova; Saw-leaf Zelkova; Keaki Tree

## Transplanting Bare Root Difficulty Charts

**Transplant Issues:** In general, whether transplanted balled and burlaped (B&B) or bare root, the larger the caliper tree, the longer it will take to become established after transplanting. As a ‘rule of thumb’, allow 1 year for every inch caliper before the tree is growing normally in its new site. Easy to transplant trees may take a shorter time to establish successfully while more difficult to transplant trees take longer. Choose the smallest caliper tree appropriate for the job, taking into consideration the site complexities and design intents. There are very few compelling reasons that justify planting a tree larger than 3” caliper at most sites. Bare root planting potential (if currently known) is listed in this section for each tree. Bare root transplanting has time constraints with a smaller window for planting but poses a less expensive option for some communities and the trees weigh less so they may be planted without machinery.

For more information on Bare Root transplanting contact the Urban Horticulture Institute to receive the Creating the Urban Forest: The Bare Root Method booklet and/or video. The booklet is available on line at the UHI website: <https://blogs.cornell.edu/urbanhort/outreach/bare-root-transplanting/>

### Trees easy to transplant bare root

<b>Botanical Name</b>	<b>Common Name</b>
<i>Acer campestre</i>	Hedge Maple
<i>Acer miyabei</i>	Miyabe Maple
<i>Acer rubrum</i>	Red Maple; Scarlet Maple; Swamp Maple
<i>Acer saccharum</i>	Sugar Maple; Rock Maple; Hard Maple
<i>Acer tataricum ssp. ginnala</i>	Amur Maple
<i>Acer x freemanii</i>	Freeman Maple
<i>Catalpa speciosa</i>	Catalpa; Indian Bean
<i>Cladrastis kentukea</i>	Yellowwood
<i>Cornus mas</i>	Corneliancherry Dogwood; Cornelian Cherry
<i>Gleditsia triacanthos</i>	Common Honeylocust; Honey Locust
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree
<i>Koelreuteria paniculata</i>	Golden-rain Tree; Varnish Tree
<i>Maackia amurensis</i>	Amur Maackia
<i>Malus spp.</i>	Flowering Crabapple

<i>Parrotia persica</i>	Persian Parrotia
<i>Phellodendron amurense</i>	Amur Cork Tree
<i>Platanus x acerifolia</i>	London Planetree
<i>Prunus 'Accolade'</i>	Flowering Cherry 'Accolade'
<i>Prunus sargentii</i>	Sargent Cherry
<i>Prunus virginiana</i>	Chokecherry
<i>Pyrus calleryana</i>	Callery Pear
<i>Quercus bicolor</i>	Swamp White Oak
<i>Quercus rubra</i>	Red Oak; Northern Red Oak
<i>Robinia pseudoacacia</i>	Black Locust
<i>Sorbus alnifolia</i>	Korean Mountain Ash
<i>Syringa reticulata</i>	Japanese Tree Lilac
<i>Tilia americana</i>	American Linden; Basswood
<i>Tilia cordata</i>	Littleleaf Linden; Small-leaved Lime
<i>Tilia x euchlora</i>	Crimean Linden
<i>Ulmus 'Accolade'</i>	Hybrid Elm 'Accolade'
<i>Ulmus americana</i>	American Elm
<i>Ulmus spp.</i>	Hybrid Elms and other species

### Trees moderately difficult to transplant bare root

<b>Botanical Name</b>	<b>Common Name</b>
<i>Amelanchier spp.</i>	Serviceberry; Shadblow
<i>Betula nigra</i>	River Birch; Red Birch
<i>Betula populifolia</i>	Gray Birch; Poplar Birch; White Birch

<i>Celtis occidentalis</i>	Hackberry; Sugarberry
<i>Cercidiphyllum japonicum</i>	Katsuratree; Katsura Tree
<i>Cercis canadensis</i>	Eastern Redbud
<i>Corylus colurna</i>	Turkish Filbert; Turkish Hazel
<i>Crataegus crus-galli</i>	Cockspur Hawthorn
<i>Crataegus viridis</i> 'Winter King'	Winter King Hawthorn
<i>Eucommia ulmoides</i>	Hardy Rubber Tree
<i>Quercus palustris</i>	Pin Oak; Swamp Oak
<i>Quercus robur</i>	English Oak; Truffle Oak; Pedunculate Oak
<i>Zelkova serrata</i>	Japanese Zelkova; Saw-leaf Zelkova; Keaki Tree

### Trees difficult to transplant bare root

<b>Botanical Name</b>	<b>Common Name</b>
<i>Carpinus betulus</i>	European Hornbeam
<i>Carpinus caroliniana</i>	American Hornbeam; Blue Beech; Ironwood; Musclewood
<i>Cotinus obovatus</i>	American Smoketree
<i>Crataegus phaenopyrum</i>	Washington Hawthorn
<i>Ginkgo biloba</i>	Ginkgo; Maidenhair Tree
<i>Liquidambar styraciflua</i>	American Sweetgum
<i>Liriodendron tulipifera</i>	Tuliptree; Tulip Poplar; Tulip Magnolia; Yellow Poplar; Whitewood
<i>Nyssa sylvatica</i>	Pepperidge; Sour Gum; Black Gum; Tupelo
<i>Ostrya virginiana</i>	Hop Hornbeam

<i>Quercus coccinea</i>	Scarlet Oak
<i>Quercus imbricaria</i>	Shingle Oak
<i>Quercus macrocarpa</i>	Bur Oak; Mossycup Oak
<i>Quercus muehlenbergii</i>	Chinkapin Oak
<i>Taxodium distichum</i>	Bald Cypress
<i>Tilia tomentosa</i>	Silver Linden
<i>Ulmus 'Frontier'</i>	Hybrid Elm 'Frontier'
<i>Ulmus parvifolia</i>	Chinese Elm; Lacebark Elm

## Recommended Conifers for Urban Sites

### Introduction

This list is a tool to ease the task of choosing species of conifers to be planted in urban or disturbed environments. Species included have been restricted to those that possess characteristics that would lend them to be hardy in New York.

Availability of the plants on the list varies with species and region; many species were culled from the list because of limited availability. Still, some plants on the list are not common in the nursery trade. They have been included because their characteristics make them suitable for wider use in the landscape, and they can be located with some effort. The sources used to screen for availability are listed in the reference section. Species with less than 10 sources cited will require some effort to locate. Users are encouraged to contact the nurseries listed in the reference lists, and to educate their local nursery if a particularly suitable species is unavailable in their area.

The information presented here is an attempt to find a consensus among authors. The information used to determine plant tolerance characteristics is often anecdotal and conflicting. If a consensus could not be determined, tolerances have not been described.

*An asterisk (\*) before a plant's name denotes a species native to New York.*

Insects and fungi that prey on trees are opportunistic attackers of individual plants weakened in the transplantation procedure. Before planting any tree, learn which problems to watch for in your area. Early diagnosis often simplifies control measures needed to ensure survival of the plant. Your local cooperative extension agent can provide information pertinent to your area.

### *Abies - the True Firs:*

As a rule, Firs require high humidity, acid soils that are moist but well drained, and cool summer temperatures. Firs transplant best in spring. Firs require full sun for best growth but can tolerate light shade.

#### **A. balsamea - Balsam Fir**

Zones 2a - 5a. 45'-75' ft, narrowly conical. Prefers acid soils that are moist and well drained. Moderate to poor salt tolerance. Will not withstand polluted areas or heat. # of sources 10

#### **A. cephalonica - Greek Fir**

Zones 5a-8a. 60'-90' ft., pyramidal. Prefers acid soils. Salt tolerance untested. Tolerates extremes of heat and drought. # of sources 5

#### **A. concolor - White or Concolor Fir**

Zone 4a-8b. 50'-80' ft, conical. pH 4.5-7.0. Moist, well drained coarse loams preferred, no clay. Salt tolerance untested, somewhat heat and drought resistant # of sources 10

#### **A. holophylla - Needle Fir**

Zone 5a-7a. 50'-80' ft., pyramidal. Prefers acidic, well drained soils but appears widely adaptable. Salt tolerance untested. # of sources 2

#### **A. homolepis - Nikko Fir**

Zone 5a-6b. 50'-100' ft., broadly pyramidal. Soil preference probably acid, salt

tolerance untested. # of sources 6

**A. koreana - Korean Fir**

Zone 5a-7a. 15'-30' ft., broadly pyramidal. pH 4.0-6.5; moist, well drained soils. Salt tolerance untested, somewhat heat tolerant. # of sources 8

**A. lasiocarpa - Rocky Mountain Fir**

Zone 5a-7b. 80-120 ft., conical or columnar. pH 4.5-7.0. 'Compacta' may be more useful than the species in the east. Salt tolerance untested. # Of sources 13, 'Compacta' 4

**A. nordmanniana - Nordmann Fir**

Zone 5b-7b. 40-60 ft., columnar. pH 4.0-6.3. Presumably does better on moist, well drained soils, salt tolerance untested. # of sources 8

**A. veitchii - Veitch Fir**

Zone 3b-5b. 50-75 ft., broadly pyramidal. pi-i 4.0-6.5, moist, well drained soils. Supposedly performs acceptably in semi-urban conditions, though it will not withstand drought. Salt tolerance untested. # of sources 5

*Chamaecyparis (Falsecypress):*

Full sun, well drained soils, protect from drying winds. Fall or spring transplant.

**C. lawsoniana - Lawson Falsecypress or Port Orford Cedar**

Zone 5b-8a. 40-80 ft., pyramidal to conical. pH 4.0-6.3, cool, moist soils and atmosphere, no high pH soils. Adequate moisture essential. No salt tolerance data available. # of sources 8

**C. nootkatensis - Nootka Falsecypress or Alaska Cedar**

Zone 5b-7b. 60-90 ft.; conical, pendulous. pH 4.0-6.5. Soil and atmospheric moisture essential. Salt tolerance untested. # of sources 4, 'Pendula' 18

**C. obtusa - Hinoki Falsecypress**

Zone 5a-8a. Size and shape will vary with cultivar. pH 4:0-6.5, moist, well drained soils preferred but somewhat adaptable to "average" conditions. Salt tolerance untested. # of sources 7; 'Crispii' 17, 'Kosteri' 14, 'Nana' 17

**C pisifera - Sawara or Japanese Falsecypress**

Zone 5a-8a. 50-70 ft., loosely pyramidal. H 4.0-6.5, moist well drained soils, high atmospheric humidity Salt tolerant. 'Boulevard' is more heat tolerant. # of sources 5, 'Boulevard' 19; 'Filifera' 12

**\* C. thyoides - Atlantic White Cedar**

Zone 5a-9a. 40-50 ft. narrowly columnar. pH 4.5-6.5, moist, sandy soil (capable of withstanding flooding), could replace yew or juniper on wet sites. Salt tolerance untested. # of sources 7, 'Andelyensis' 7

*Juniperus - Junipers:*

Full sun essential, tolerant of drought, clay, and pollution. Transplant containerized or B&B anytime.

**J. chinensis - Chinese Juniper**

Zone 4a-9a depending on cultivar. Size varies with cultivar, Dirr discusses over 60 cultivars. pH adaptable, tolerant of calcareous soils, drought. Salt tolerance untested.

# of sources 6

**\* J. communis - Common Juniper**

Zone 3a-8a depending on the cultivar. Size and form varies with cultivar. Tolerates all adverse conditions except extreme heat. Somewhat salt tolerant. # of sources 10

**\*J. horizontalis - Creeping Juniper**

Zone 2a-9a depending on cultivar. Size varies with cultivar, low and spreading. Tolerant of salt, drought... but phomopsis devastates. # of sources 10

**J. procumbens - Japanese Garden Juniper**

Zone 5a-9a. 8"-24" inches, low and spreading. pH adaptable, somewhat salt tolerant, thrives under adverse conditions. # of sources 13

**J. rigida - Needle Juniper**

Zone 5a-8a. 25'-40' ft., loosely columnar with pendulous tertiary shoots. pH 4.0 - 6.5. Tolerances not available. # of sources 4, 'Pendula' 4

**J. sabina - Savin Juniper**

Zone 3b-8b depending on cultivar. 4-10 ft., form varies with cultivar from spreading to upright. pH adaptable, tolerant of drought and salt. # of sources 10

**J. squamata - Singleseed Juniper**

Zone 5a-8a. Size varies with cultivar, most are low and spreading. pH adaptable, tolerates dry soils but not heat. Somewhat salt tolerant. # of sources 10, 'Blue Star' 10

**J. virginiana - Eastern Red Cedar**

Zone 3b-9a. Size and form varies with cultivar from spreading shrub to 50 ft. tall tree. Tolerates adverse conditions, salt. # of sources 10

*Larix - Larches:*

Readily transplanted in spring before bud break or whenever dormant. Full sun required.

**L. decidua - European Larch**

Zone 5a-9a. 70 - 100 ft., pyramidal. pH 4.0 - 6.5. Prefers moist, well drained soils but will tolerate boggy soils. Salt tolerance is in question, one source says it is tolerant while others deny that it is. Will not tolerate drought. # of sources 10, 'Pendula' 10

**L. kaempferi - Japanese Larch**

Zone 4a-6b. 70 - 90 ft., openly pyramidal. pH 4.5 - 6.5. Moist, well drained soils are essential, and will not tolerate drought. Salt tolerant. # of sources 25

**\*L. laricina - Tamarack or Eastern Larch**

Zone 2-6b. 40 - 80 ft., openly pyramidal. pH 4:8 - 7.5. Prefers moist, well drained soils, will not tolerate drought. Tolerant of flooding and salt, but incapable of withstanding heat or pollution. # of sources 11

*Metasequoia:*

Requires full sun. Transplant B&B in spring or fall.

**Metasequoia glyptostroboides - Dawn Redwood**

Zone 5b - 9a. 70 - 100 ft. conically pyramidal. pH 4.5 - 7.0. Prefers deep, moist, well drained soils, will not withstand alkaline soils. Will not tolerate drought. Salt tolerance untested. Susceptible to twig kill in frost pockets. # of sources 43

## *Microbiota:*

Full sun to partial shade, does best in semi-shade. Transplant B&B or containerized in spring or fall.

### **Microbiota decussata - Siberian Cypress**

Zone 2-3. 12-18 inches, upright and spreading. pH adaptable, drought tolerant once established. Not suitable for droughty sites subject to full sun. Salt tolerance untested. # of sources 30

## *Picea - Spruces:*

Full sun. Transplant B&B in spring or fall.

### **P. abies - Norway Spruce**

Zone 3a-8a. 60 -100 ft., pyramidal with pendulous secondary branches. pH 4.0-7.0, prefers moderately moist, well drained sandy soils but it is a tough plant that succeeds in a variety of difficult sites. Low salt tolerance. Numerous cultivars vary in size and form. # of sources 20, cultivars common in the trade

### **P. engelmannii - Engelmann Spruce**

Zone 3a-7b. 50 - 80 ft., narrowly pyramidal. pH 4.6 - 6.5, prefers deep rich loamy soils with a high moisture content. Salt tolerance data unavailable. # of sources 15

### **\*P. glauca - White Spruce**

Zone 2a-7a. 40-60 ft., broadly pyramidal but narrowing with age. pH 4.6 - 8.0, prefers medium loams. Will withstand moderately poor drain-age and drought. Highly tolerant of salt, tolerant of wind, heat, cold. # of sources 20

### **\*P. pungens - Colorado Spruce**

Zone 3a-7b. 30-60 ft., narrow to broadly pyramidal. pH 4.5-7.0, prefers rich, moist soil but adaptable and somewhat drought tolerant. High salt tolerance. # of sources 20

## *Pinus - Pines:*

### **P. cembra - Swiss Stone Pine**

Zone 3b-6b. 30-40 ft., narrowly columnar/pyramidal becoming open with age. pH 4.0-6.5, soil must be well drained. Salt sensitive. # of sources 25

### **P. densiflora - Japanese Red Pine**

Zone 5b-7b. 40-60 ft., very irregular. pH 4.0-7.0, well drained slightly acid soils. Moderately salt tolerant. # of sources 9

### **P. flexilis - Limber Pine**

Zone 4b-7b. 30-50 ft., broadly pyramidal becoming flat-topped with age. pH 4.0-7.0, prefers moist, well drained soils but adaptable to drier sites. Salt tolerance data unavailable. # of sources 20

### **P. koraiensis - Korean Pine**

Zone 4a-7b. 30-40 ft., loosely pyramidal. pH 4.5-7.0, tremendously adaptable to various soil conditions. Salt tolerance data unavailable. # of sources 15

### **P. mugo - Mugo Pine**

Zone 3a-7b. Size varies with cultivar. Form prostrate to pyramidal, usually low and spreading. pH 4.0-7.0, prefers a deep, well drained soil but adapt-able to drier sites, calcareous soil tolerant, high salt tolerance. # of sources – common in the trade

**P. nigra - Austrian Pine**

Zone 4a-8a. 50-60 ft., pyramidal in youth becoming broader with age. pH 4.0-7.0, soil condition adaptable; somewhat drought resistant, withstands heat. Salt tolerant. Very adaptable, but plagued with diplodia tip blight when older. # of sources 20

**P. parviflora - Japanese White Pine**

Zone 5b-9a 25-50 ft., conical in youth becoming broader with age. Does best with adequate moisture but somewhat drought tolerant, requires good drainage. Salt tolerant, soil adaptable. # of sources 10

**P. peuce - Balkan or Macedonian Pine**

Zone 5a-9a. 30-60 ft., narrowly pyramidal to columnar. pH 4.0-7.0, quite adaptable but requires good drainage. Moderately salt tolerant. # of sources 8

**P. ponderosa - Ponderosa Pine**

Zone 3b-8a. 60-100 ft., pyramidal in youth becoming irregularly columnar with age. pH 4.0-7.0. Prefers deep, well drained loam; tolerates drought, alkaline soils, and salt. # of sources 41

**P. resinosa - Red Pine**

Zone 3a-6b. 50-80 ft., pyramidal in youth becoming oval in maturity pH 4.0-6.3, dry, sandy acid soils, does well on nearly sterile sites providing adequate drainage if available; fails if drainage is less than perfect. Salt susceptible. # of sources 20

**\* P. rigida - Pitch Pin**

Zone 4b-7a. 40-60 ft., irregularly pyramidal. pH 4.0-6.5, prefers adequate moisture but tolerant of severe drought and sterile soils. Salt tolerant. Susceptible to wind burn. # of sources 7

**\*P. Strobis - Eastern White Pine**

Zone 3a-9a. 50-80 ft., pyramidal in youth becoming open and irregular with age. pH 4.0-6.5, prefers moist, well drained soils but will withstand drier sites. Extremely sensitive to salt and air pollution, will not tolerate alkaline soils. # of sources - common in the trade

**P. strobiformis - Southwestern White Pine**

Moderately salt and drought tolerant. # of sources 12

**P. sylvestris - Scotch Pine**

Zone 3a-8b. 30-60 ft., irregularly pyramidal becoming flat-topped or rounded with age. pH 4.0-7.0, soil adaptable with adequate drainage. Tolerant of drought, sterile soils. Salt intolerant. # of sources 20

**\*P. virginia - Virginia or Scrub Pine**

Zone 5b-9a. 15-40 ft., open, broadly pyramidal becoming ragged with age. pH 4.0-7.0, prefers a clay or sandy loam but will withstand poor dry soils, no high pH soils. Salt tolerance data unavailable. # of sources 13

**P. wallichiana - Himalayan or Bhutan Pine**

Zone 5b-9a. 30-50 ft., broadly pyramidal in youth becoming open with age. Prefers a sandy, well drained loam, requirements similar to eastern white pine. Salt tolerance data unavailable. # of sources 13

### *Pseudotsuga:*

Full sun required. Transplant B&B in spring or fall.

#### **Pseudotsuga menziesii - Douglas Fir**

Zone 3b-6b. 40-80 ft., openly pyramidal. pH 4.0-6.5, moist, well drained soils, drought intolerant, no winter wind. Salt intolerant. # of sources common in the trade.

### *Taxodium:*

Full sun. Transplant B&B in spring or fall.

#### **Taxodium distichum - Bald Cypress**

Zone 5a-9a. 50-70 ft., narrowly pyramidal. pH 4.0-7.0, prefers deep, moist sandy loams, but adaptable to wet or dry soils. Tolerant of soil flooding. Chlorotic on high pH sites. Salt tolerance is moderate. # of sources 20

### *Taxus - Yews:*

Will tolerate sun or shade. Transplant B&B or containerized in spring or fall. There is a large selection of cultivars of this popular genus, many of which are suited to the urban landscape. Check the characteristics of cultivars to ensure the best match to your site.

#### **Taxus cuspidata - Japanese Yew**

Zone 4b-7b. 10-40 ft., irregular, loose spreading shrub with upright branching habit pH 4.5-7.5, moist, well drained sandy loam, adaptable but requires good drainage. Pollution and shearing tolerant. Moderately salt tolerant. Common in the trade.

#### **T. x media - Angoljap Yew**

Zone 5a-7b. Size varies with cultivar. pH 4.5-6.5, moist, well drained sandy foams. Good drainage essential: Salt tolerance data unavailable, probably intolerant. Common in the trade.

### *Thuja:*

Transplant B&B or containerized spring or fall. Full sun required for full specimens, will tolerate light shade but becomes thin.

#### **\*Thuja occidentalis - American Arborvitae or White Cedar**

Zone 3a-7b. 40-60 ft., dense, broadly pyramidal. pH 4.5-7.0+, deep, well drained soils with abundant soil and atmospheric moisture. Tolerant of heat and drought once established. Susceptible to snow and ice damage. Moderate salt tolerance. # of sources 28, 'Nigra' 20

#### **Thuja standishii x plicata - 'Green Giant'**

Zone 5-7. 50' – 60' tall, 12' – 20' wide. Pyramidal to conical in form. Fast growing, 24" - 36" per year. Resistant to wind once established. Full sun to partial shade. Avoid poorly drained and wet sites.

### *Tsuga:*

Best growth in full sun or, light shade, will tolerate full shade. Transplant B&B in spring or fall.

#### **\*Tsuga canadensis - Eastern or Canada Hemlock**

Zone 3a-8a. 40-70 ft., pyramidal in youth becoming pendulous with age. pH 4.0- 6.5,

prefers moist, well drained acidic soils, somewhat tolerant of calcareous soils. No wind or drought, no pollution. Hemlock Woolly Adelgid can kill trees within three or four years if left uncontrolled. Salt intolerant. # of sources 20

**T. caroliniana - Carolina Hemlock**

Zone 5b-7b. 45-60 ft., pyramidal. pH 4.0-6.5, moist, well drained soils essential. Will not tolerate drought. Salt tolerance data unavailable. # of sources 9

**T. diversifolia - Japanese Hemlock**

Zone 5b-7b. 25-50 ft., compact and shrubby tree. Environmental tolerances not available # of sources 9

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*Photo Sources:*

F 1 - <https://mbgna.umich.edu/learning-how-to-identify-woody-plants/>

f 2 - <http://lifeofplant.blogspot.com/2011/03/leaf-arrangements.html>

f 3 - [https://en.wikipedia.org/wiki/Glossary\\_of\\_leaf\\_morphology#/media/File:Leaf\\_morphology.svg](https://en.wikipedia.org/wiki/Glossary_of_leaf_morphology#/media/File:Leaf_morphology.svg)

f4 <https://www2.palomar.edu/users/warmstrong/term1f2.htm>

f 5 – from original cnlp manual

f 6 – from original cnlp manual

f 7 - <https://k8schoollessons.com/parts-of-a-flower/>

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f 9 - [https://www.gardeningknowhow.com/wp-content/uploads/2004/10/new\\_york\\_map\\_lg.gif](https://www.gardeningknowhow.com/wp-content/uploads/2004/10/new_york_map_lg.gif)

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## Recommended Shrubs

### *Shrubs For Difficult Sites:*

\*Indicates species native to North America

#### A

##### **Acauthopanax sieboldianus - Five-Leaf Aralia**

Height: 8-10' Spread: 8-10', upright and arching. Zones 4a-8a. Tolerates dry soils and a wide range of pH. Full sun to full shade; sand to clayey soils. Tolerants air-borne pollutants. A variegated form exists but is difficult to find. Sharp spines make this plant an effective barrier.

##### **\*Aesculus parviflora - Bottlebrush Buckeye**

Height 6-8' Very wide spreading (to 15) and suckering. Zones 5a-9a. Salt tolerant and adaptable to high pH soils. Needs moist conditions. Will tolerate moderate shade. 'Maintenance-free' and resistant to disease and insects. Difficult to transplant; use container or B&B. Seasonal interests include striking coarse textured foliage, yellow fall color, and midsummer showy white flowers. Cultivars: var. serotina, 'Rogers'.

### *The Amelanchiers:*

The Amelanchiers are a group of shrubs and small trees that are deservedly becoming more popular. They have good seasonal interest (early white flowers, red berries and often brilliant red/orange fall color), but are often mis-labeled in the trade due to the fact that the selections are taxonomically difficult to separate.

Most need moist to wet soil and tolerate pH up to 7.0 or 7.5, no higher. They are also tolerant of partial shade. Most species bear fruit attractive to wildlife. Fireblight may be a problem in some areas, check with your local cooperative agent.

##### **\* Amelanchier arborea - Downy Serviceberry**

Height 15-25'. Spread 10-20'. Zones 3b-8a. Prefers moist, well drained acid soil (up to neutral pH). Full sun or partial shade. Seasonal interests include ornamental silver gray bark, white flowers in early spring and red/ orange fall color. Red fruits attract birds and humans alike. Susceptible to lire blight and mites. Cultivars: 'Princess Diana' (abundant white flowers, excellent fall foliage), 'Prince William' (smaller size, more winter hardy). See Recommended Urban Trees for tree form cultivars.

##### **\*Amelanchier alnifolia - Saskatoon Serviceberry**

Height 3-18'. Spread 5-10'. Zones 3b-5. Tolerates harsh climates and alkaline soil. Relatively low, thicket-forming shrub with upright branches. Known for its large edible fruits which ripen in July.

##### **\* Amelanchier canadensis - Shadblow Serviceberry**

Height 6-20'. Spread 10-20'. Zones 3b-8a. Demands moist to average soil moisture and a pH range below 7.0. Found in bogs and swampy areas. Erect stems spread by means of suckering from the base. The shrub is known for its white flowers in early spring, edible globular berries and yellow fall color.

**\*Amelanchier laevis**

Height 20-25'. Spread 20-30'. Zones' 3b-8a. Sensitive to°salt and drought, yet tolerates wet soil conditions. Functionally interchangeable in most landscape situations with A. arboreal. White flowers in early spring.

**\*Aralia spinosa - Devil's-Walking Stick**

Height 35-40' Spread 20-5'. Zones 5a-9a. Resistant to drought and heat. Tolerant of a variety of soils and is easy to transplant. Best in full sun or partial shade. A fast growing shrub that suckers from the base creating an umbrella-like form. Coarsely textured leaves and stems turn dull red / orange in the fall Thorns exist on the stems.

**\*Aronia arbutifolia - Red Chokeberry**

Height 6-12'. Spread 3-12'. Zones 4b-9a Tolerates wet or dry soil and is salt resistant. Prefers full sun or partial shade. Transplants well. Bright red fruit clusters in the fall and red/purple fall color. Best massed because of leggy quality. Cultivars: 'Brilliantissima' (shiny berries), 'Erecta' (narrow upright habit).

**B**

**Berberis koreana - Korean Barberry**

Height 4-6'. Spread 3-5'. Zones 3b to 8a. Tolerates any soil that is well drained. Full sun to partial shade.

**C**

**Caragana arborescens - Siberian Peashrub**

Height 15'. Spread 15-20' (upright, multi stemmed). Zones 2a 6b. Tolerant of salt, drought, alkalinity, and extreme cold temperatures. Makes a good windbreak and is suitable for container planting. Shrub fixes its own nitrogen. Yellow flowers are not very showy. Cultivars: 'Lorbergii', 'Nana', 'Sutherland', 'Pendula' and 'Walker' (weeping forms grafted on 6' standard). A very tough plant.

**\* Celastrus scandens - American Bittersweet**

Height 13-19'. Spread (vine). Zones 3b-8b. Withstands about any soil condition including drought pH adaptable. Full sun. Fruits are deep yellow with red/orange arils. A fast growing, invasive vine.

**\* Cercis canadensis - Eastern Redbud**

Height 20-35'. Spread 20-35'. Zones 5b(a)-9a. Prefers moist well drained soil and a pH range of 6.1-8.0 Tolerant of shade, heat, and once established, drought. Very sensitive to salt. Seasonal interests include lavender/pink flowers clusters in mid April, bean-like pods from July through December and dark green foliage turning bright yellow in the autumn. Also has a horizontal, picturesque branching habit. Canker and Verticillium wilt can cause damage. Cultivars: 'Alba' (white flowers), 'Withers Pink Charm', 'Royal', 'Forest Pansy' (purplish foliage).

\* **Chionanthus virginicus - Fringe Tree/Old Man's Beard**

Height 15-20' Spread 15-25' (broad spreading habit) Zones 5a-9a. Prefers moist soil and a pH below 7.0. Can tolerate salt, intermittent wet conditions. Full sun. Pest free. Transplant as a small B&B or container. Seasons interests include white flower clusters in late spring and yellow fall color. Shrub is late to leaf out. Tolerates air-borne pollutants.

\* **Clethra alnifolia - Summersweet Clethra**

Height 4-8'. Spreads slowly in cumps to 8'. Zones 4b-9a+. Needs moist acid soil. Can handle poorly drained sites and shady or sunny locations. Also resistant to salt and salt spray. Fragrant flowers appear in July and August. Yellow foliage in autumn. Seed heads persist into winter. Late to leaf out in spring Cultivars: 'Paniculata', 'Pink Spires', 'Rosea' (pale pink flowers).

**Cornus Alba - Tatarian Dogwood**

Height 6-s'. Spread 5-8' (rounded). Zones 3a-8a. Very adaptable to pH, cold, wet or dry conditions. Salt tolerant as well. Sun or partial shade. Small white flower clusters appear in late spring. Red fall color. Basal pruning in early spring is required to maintain bright red stems which occur on current year's growth. Easily transplanted. Cultivars: 'Gouchaultii', 'Kesselringii', 'Siberica', 'Spaethii' (green and yellow variegated leaves), 'Argenteo-marginata' (variegated green and white leaves), 'Aurea'.

**Cornus kousa - Japanese Dogwood**

Height 20-30'. Spread 20-30'. Zones 5a-7b. Likes well drained, slightly acidic soil. In times of severe drought, shrub needs to be fertilized and irrigated, but more drought tolerant than C. Florida Best in full sun. Creamy white bracts are borne in June, usually three weeks after Cornus Florida. Medium green leaves turn red in the fall. Dull red dangling fruits appear in late summer. Cultivars: 'Milky Way' (heavy flowering), 'Summer Stars'.

**Cornus mas - Cornelian Cherry**

Height 18'. Spread 15-20'. Zones 5a-8a. Adaptable to pH and drought situations. Ideal conditions include good drainage and full sun. Yellow blooms in early spring with edible fruits ripening later. Pest free. Cultivars: 'Allra', 'Aurea', 'Flava', 'Golden Glory', 'Nana', 'Variegata (variegated cultivar).

**Cornus officinalis - Japanese Coral Dogwood**

Similar to Cornelian cherry but habit more open, develops more showy flaking bark with age.

\* **Cornus racemosa - Gray Dogwood**

Height 10-15'. Spread 10-15' (easily maintained at 6-8). Zones 3b-7b. Tolerates alkaline soils to 8.5 pH. Resistant to heat and drought. Adaptable to wet and dry soil conditions. Sun or shade. Seasonal interests include white flowers in June, white persistent-berries in autumn and purplish fall color. Red pedicels remain attractive most of the summer and fall. This is a good choice for roadside locations. Spreads by-suckering. Can be pruned to within inches of the ground to increase fullness. Has been grown successfully as a small standard tree for use in restricted spaces. Cultivar: 'Slavinii'.

**\* *Cornus sericea* - Red Osier Dogwood**

Height 7-9'. Spread 10'. Zones 3a-8a. Will grow well in almost any soil including wet conditions. Similar to *Cornus alba*. Excellent purple foliage in the fall: Red stem color is very appealing in the winter. A good choice for stabilizing banks. Cultivars: 'Cardinal', 'Flaviramea' (yellow twig color)

***Cornus avellana* - European Filbert**

Height: 12-20'. Spread 20-24' forming a dense thicket. Zones 4b-8b. Well adapted to poor dry soils. Full sun to light shade. Cultivar 'Harry Lauder's Walkingstick' has twisted branches of considerable value for winter texture.

***Cotinus coggygria* - Smokebush**

Height 10-15'. Spread 10-15' (irregular, upright, open). Zones 5a-7b. Adapt-able to dry soils of varying pH. Requires full sun. Easily transplanted. Showy pubescence on inflorescence creating a soft 'smoky' effect. Slow growing. Cultivars: 'Daydream', 'Flame', 'Foliis Purpureis', 'Nordine', 'Notcutt's', 'Royal Purple' (heavy pruning promotes good purple color), 'Variety', 'Velvet Cloak' (dark purple leaved variants)

***Cotoneaster apiculatus* - Cranberry Cotoneaster**

Height: 3'. Spread: 3-6', low spreading form. Zones 5a-8b. Adaptable to a wide range of soils, does well in high pH. Drought tolerant once established. Foliage a dark green.

***Cotoneaster divaricatus* - Spreading Cotoneaster**

Height: 5-6'. Spread: 6\$', spreading shrub with drooping branches. Zone 5a-Sb. Full sun to light shade. Adaptable to a range of soils and pH. Salt tolerant. Good for borders, massing. Good summer foliage character.

**D**

***Diervilla sessilifolia* - Southern Bush Honeysuckle**

Height: 3-5'. Spread: 3-5', spreading. Zones-4b-8a. Tremendously adaptable and trouble free. Full sun to moderate shade. Good plant for mass planting on banks or as a large scale groundcover.

**F**

***Forsythia x intermedia* - Border Forsythia**

Height 8-10'. Spread 10-12'. Zones 5b-8a: Will do well in any soil, pH adapt-able. Transplant bare root or B&B. Best in full sun to maximize flowers. Brilliant yellow flowers in early spring. Renewal pruning is needed after flowering every few years. Cultivars: Vary according to size, form, habit, flower size, and shades of yellow flower color. 'Lynwood Gold', 'Spectabile' (bigger flowers, more floriferous), 'Northern Sun', 'New Hampshire Gold' (better flower bud hardiness).

***Forsythia ovata* - Early Forsythia**

Height: 4-6'. Spread: 4-6'. Zones 5a-7b. Adaptable to various soil textures and moisture regimes, airborne pollutant tolerant. Yellow flowers borne in early spring. Useful because flower buds are hardier than those of other forsythia. 'Ottawa' flowers more profusely than the species.

**Fothergilla gardenii - Dwarf Fothergilla**

Height 3'. Spread 3'. Zones 4(5)-8(9). Adaptable only to neutral pH, no higher. Prefers moist soil and will tolerate poor drainage. Grows in sun or shade. Seasonal interests include white flowers in early spring and orange autumn color. Disease free and requires little maintenance.

**G**

**Genista tinctoria - Common Woadwaxen**

Height: 2-3'. Spread: 2-3' Zones 3a-8a. Thrives in hot sunny spots of low fertility. Tolerates dry and wet sites. pH adaptable. Bright yellow flowers in early summer.

*The Witch-hazels:*

An under-used group of shrubs that provide seasonal interest at the extremes of the season-late fall or early spring-with yellow flowers and good. Yellow fall color. Tolerant of moist to wet conditions and shade.

**Hamamelis x intermedia - Hybrid Witch-hazel**

Height 15-20'. Spread 15-20'. Zones:5-8. Prefers add soil and withstands variable moisture conditions. Not salt tolerant Does well in sun or shade. Yellow flowers in late winter or early spring. Transplant B&B. Cultivars: 'Diana' (rust color), 'Arnold's Promise' (larger yellow flowers).

**Hamamelis mollis - Chinese Witch-hazel**

Height 10-15'. Spread 10-15'. Zones 5a-9a\_ Prefers acid soil; will not take high pH soils. Neat rounded plants are easily maintained. Transplant B&B. Yellow flowers appear in late winter or early spring. Trouble-free. Cultivar: 'Brevipetala' (showy large blooms).

**\* Hamamelis vernalis - Vernal Witch-hazel**

Height 6-12'. Spread 10-15'r Zones 4-8. Prefers acid soil. Tolerant of shade and flooded conditions, although not salt. Can handle poorly drained soils and limited drought conditions. Seasonal interests include yellow fragrant flowers in February. Usually the first shrub to bloom in spring and golden yellow fall color. Sometimes persistent leaves compete with flowers.

**\*Hamamelis virginiana - Common Witch-hazel**

Height 15-25'\_ Spread 15-25'. Zones 4a-9a. Adaptable to different soil pH up to neutral or slightly alkaline. Needs moist conditions. Tolerant of shade, not salt. This is the last shrub to bear flowers in the fall. Bright yellow fall color can obscure fragrant yellow blooms.

**G**

**Hibiscus syriacus - Rose-of-Sharon**

Height 8-12'. Spread 6-10'. Zones 5b-9a. Grows in about any soil except those which are extremely wet. Full sun or partial shade. Flowers in late summer when few other woody plants are in bloom. Cultivars: Many. Vary according to single or double flowers as well as flower color.

### **Hippophae rhamnoides - Common Seabuckthorn**

Height 8-30'. Spread 10-40'. Zones 3a-7a. Adaptable to very poor, dry soils. Grows well in seaside sites and is relatively tolerant of road salt. Silver/ green willow like leaves and bright orange berries in winter add season interests. Need ratio of 6 females to 1 male for pollination to ensure fruit production. Difficult to get established.

### **Hydrangea arborescens - Smooth Hydrangea**

Height: 3-5'. Spread: 3-5'. Zones 4a-9a. Adaptable to a wide range of soils and pi-l. Large white flowers early to mid-summer. Killed to the ground in the northern parts of its useful range but regrowth is vigorous. 'Annabelle' has larger flowers.

### **Hydrangea paniculata - Panicle Hydrangea**

Height: 15-25'. Spread: 10-2Q'. Adaptable to various soil conditions. Very tough. White flowers borne in mid-July persist through the summer.

### **\* Hydrangea quercifolia - Oakleaf Hydrangea 'Snow Queen'**

Height: 3-6'. Spread: 3-6' (rounded). Zones 5b-9a. Soil pH as high as 8.5 is acceptable. Needs moist well drained soil conditions. Very shade and salt tolerant. Showy white flower clusters turn pink in late summer and brown towards autumn. Coarse green foliage changes to reddish/purple in fall. Plant parts are poisonous. Pest free.

I

### **Ilex glabra - Inkberry**

Height: 6-8'. Spread: 8-10'. Zones 5a-9a. Glossy green foliage is persistent. Native to moist, acidic sites; shade tolerant, salt tolerant. This shrub responds well to shearing and is suited to mass planting or as a hedge. Protect from winter winds in northern reaches of hardiness.

### **Ilex x meserveae - Meserve or Blue Holly**

Height 8'. Spread 8' (varies with cultivars). Zones 5a-8a. A dioecious broad-leaved evergreen that requires acid soil conditions. Tolerates cold temperatures and needs moist well drained soils. Best red berries occur when in full sun. Cultivars: Vary depending on habit and quantity/quality of fruit.

### **\* Ilex verticillata - Winterberry/Black Alder**

Height 6-8'. Spread 6-12' (upright, rounded). Zones 4a-9a. Tolerant of pH below 7. Needs moist soil conditions for best growth and will tolerate wet soils. Not considered salt tolerant. Deciduous and dioecious. There must be occasional males for pollination and fruiting. Bright red fruits appear while leaves are still green and persist through the winter. Yellow fall color. Cultivars: 'Winter red', 'Sparkleberry' (hold more abundant berries longer through winter), 'Aurantiaca', 'Chrysocarpa' (yellow fruit), 'Nana'

K

### **Kerria japonica - Kerria 'Pleniflora'**

Height: 3-6'. Spread: 9' (rounded). Zones 5b-9a. pH adaptable. Requires well drained soil. Full sun to part shade. Long lasting, double, golden yellow flowers bloom in mid spring. (Blooms fade quickly in full sun). Bright green foliage through summer. Twigs and branches maintain bright green color through winter. Trouble free plant.

**Kolkwitzia amabilis - Beauty Bush**

Height 6-10'. Spread 6-8'. Zones 5a-8& pH adaptable. Easily transplanted B&B in well drained soil. Seasonal interests include profuse pink flowers in June, red autumn color and exfoliating bark. Regular pruning to maintain form.

**L**

**Ligustrum amurense - Amur Privet**

Height 12-15'. Spread 8-12'. Zones 1b-8a. Adaptable to any soil except those which are extremely wet. Full sun to partial shade. Transplant bare root. Bright green foliage turns yellow in the autumn. Small black-blue fruits add extra fall interest. May be sheared. Tolerant of air pollution and drought.

**Ligustrum amurense - Common Privet**

Height: 12-45'. Spread: 10-15'. Zones 4b-80: Adaptable plant for drought conditions or a wide range of pH: Full sun to part shade. 'Densiflorum' maintains a narrow dense form longer than the species. 'Cheyenne' is harder than other cultivars.

**M**

**Magnolia x soulangiana - Saucer Magnolia**

Height 20-30'. Spread 20-30'. Zones 5a-9a. Adaptable to high pH soil. Fragrant flowers bloom in mid-late spring. Light green foliage falls in the -autumn with little color change. Silvery gray bark adds winter interest.

**Magnolia x stellata - Star Magnolia**

Height 15-20'. Spread 10-15'. Zones 5a-9a. Prefers a peaty, organic-based soil; but adaptable to high pH. Has double, white, fragrant flowers over 3" in diameter in early spring; Dark green foliage turns yellow in the fall.

**Magnolia virginiana - Sweetbay Magnolia**

Height 10-20'. Spread 10-20'. Zones 5b-9a. Does well in wet and even swampy soils. Prefers acid conditions. Tolerates shade. Lemon-scented, waxy-white flowers appear in June. Gray bark and good foliage make it an attractive shrub. Winter damage may be a problem. Best in sheltered locations in zone 5.

\* **Myrica pensylvanica - Bayberry**

Height 6-8'. Spread (rounded). Zones 4b-9a. Does well in wet or dry conditions. Very tolerant of road salt and sea spray. Can handle poor soil conditions. Capable of fixing and using-atmospheric nitrogen Aromatic, semi evergreen leaves. Waxy gray berries persist through winter. Dioecious. Females produce gray/blue berries. Fruits and leaves are eaten by many winter birds. Slow growing.

**P**

**Philadelphus coronarius - Sweet Mock Orange**

Height 10-12'. Spread 10-12'. Zones 4a-7b; pH adaptable and drought tolerant once established. Transplants easily. Full sun or partial shade. Very fragrant flowers blooming in early June. Requires pruning to maintain fullness.

### **Physocarpus opulifolius – Ninebark**

5' – 6' tall and wide. Zones 3 – 7. Full sun to part shade. Clusters of white/pink flowers in late spring, turning to red seeds heads. Number of cultivars available. Hard dormant pruning every other season results in a dense, full form.

## **R**

### **Ribes alpinum - Alpine Currant**

Height 3-6'. Spread 3-8'. Zones 3b-7b. Does well in high pH soils. Easily transplanted, best handled as a container plant. Full sun or partial shade. Dark green, finely textured foliage appears very early in the season. Cannot be planted legally in white pine habitat areas because shrub is alternate host to white pine blister rust. Mite infestations are a potential problem in dry summers.

### **\*Robinia hispida - Bristly Locust**

Height: 6-14'. Spread: 10-15', spreading by suckering. Zone 4b-9a. Tolerant of dry sterile soils; elevated pH. Flowers 3", red to lavender in late spring. Tough plant that lends itself to massing.

### **Rosa rugosa - Rugosa Rose**

Height 4-6'. Spread 4-8'. Zones 3a-7b. Grows best in exposed sites with full sun. Not tolerant of high pH soils, but is tolerant of salt. Seasonal interests include pink to white flowers in early June, brick red fruits in fall, and orange in autumn. May need occasional pruning. Cultivars: Over 50 in existence afford interesting choices for flower color.

## **S**

### **Salix purpurea - Purple Osier Willow**

Height 8-10'. Spread 8-10'. Zones 3b-9a. More tolerant of wind than most willows because of resilient branches, but less tolerant of wet and high pH soils. Twigs and branches are slender and purplish when young, used in basket weaving. When specimens become overgrown, cut to the ground. Good for erosion control and bank establishment. Cultivar. 'Nana' (compact with blue/green leaves) also. called 'Arctic Blue Leaf'.

### **\* Sambucus canadensis - American Elder**

Height 5-12'. Spread 8-15'. Zones 3a-9a. Thrives under acid or alkaline conditions. Small white flowers appear in early June. Blue-black in late summer attracts birds, jelly and wine makers alike. Suckers profusely and requires heavy pruning if it is to be kept in presentable condition. Tolerates dry soils after establishment.

### **Sorbaria sorbifolia - Ural False Spirea**

Height 5-10'. Spread 5-10'. Zones 3a-8b. Transplants readily in moist, well drained organic soils. Full sun to half shade. White flowers appear in large pyramidal panicles in late July. One of the first plants to leaf out in spring. Spreading and vigorous—a good bank stabilizer. Occasional mite infestations.

### **Spiraea x bumalda - Bumald Spirea**

Height 2-3'. Spread 3-5'. Zones 4a-9a. More sensitive to calcareous soils than most spiraeas and lime chlorosis occurs on some of the heavier midwestern soils. Prefers

full sun and open areas. Bright crimson flowers come in flat clusters in July. Medium green leaves form fairly compact masses turning orange in some autumns. Cultivars: 'Anthony Waterer' (blooms intermittently for several weeks), 'Gold Flame' (leaves "on fire" coloration when emerge in the spring), 'Goldmound' (chartreuse yellow foliage), 'Little Princess' deeper pink flower).

**Spiraea japonica - Japanese Spirea**

Height 4-5'. Spread 4-5'. Zones 4a-9a. Deep crimson flowers appear around mid-June. The flat flower clusters. may be as much as 45" in diameter. Seems to be slightly more hardy than 'Anthony Waterer'. In late summer, plants can look pretty ragged.

**Spiraea x vanhouttei - Vanhoutte Spirea**

Height 6-7'. Spread 10-12'. Zones 3b-8b. Prefers full sun. Tolerates varying pHs and intermittent drought. The arcing, fountain-like habit coupled with the profusion of white flowers in April has made this shrub popular. Aphids and powdery mildew can be problems. Long-lived in the landscape.

**Stephanandra incisa - Cutleaf Stephanandra**

Height 2-3'. Spread 4-7'. Zones 5a-8b. Will develop chlorosis in high pH soils. Prefers well drained soil. Tolerant of considerable shade, but looks best when exposed to some direct sun. A graceful shrub with finely cut leaves, arching branches and slender stems. Reddish purple fall color. Cultivar: 'Crispa' (a good ground cover).

**Syringa meyeri - Meyer Lilac**

Height: 4-8'. Spread: 10-12', densely rounded outline. Zones 4a-7b. Adapt-able, maintenance free lilac resistant to powdery mildew. Flowers are pale purple.

**Syringa microphylla - Littleleaf Lilac**

Height: 6-8'. Spread: 10-12', broadly spreading. Zones 5a-7b. Wide range of tolerable pH. 'Superba' has a better floral show than the species Heat tolerant, powdery mildew resistant. S. patula is similar but it is hardy to zone 3a.

**Syringa vulgaris - Common Lilac**

Height 8-15'. Spread 6-12'. Zones 3b-7b. Best in soils that are close to neutral pH. Full sun for best flowering. Fragrant flowers in mid-May. Dark green foliage in summer. Shrub is susceptible to a number of diseases and insects including powdery mildew, leaf spot, graft blight, and scale. Cultivars: Over 400 differing in blossom size, color and habit.

*The Viburnums:*

The viburnums are shrubs that withstand a great variety of soil and microclimate conditions. Justifiably popular, they have multi-seasonal interest and are generally easy to grow. The National Arboretum has introduced numerous improved cultivars with Native American names.

**\*Viburnum acerifolium - Mapleleaf Viburnum**

Height: 4-6'. Spread: 3-4'. Zones 3b-9a. Extremely shade tolerant, adaptable to droughty soils. Great understory plant. Fall foliage color outstanding pinkish red to light red-purple.

**Viburnum x burkwoodii - Burkwood Viburnum**

Height 8-10'. Spread 5b-8b. Prefers slightly moist, well drained soil, is pH adaptable

but prefers slightly acid situations. Lustrous dark green leaves turning yellowish to wine/red in autumn. Hardy as *V. carlesii*, more vigorous in habit and easily propagated by cuttings. Cultivar: 'Mohawk' (larger leaves, deeper pink buds, resistant to leaf spot and powdery mildew).

#### ***Viburnum carlesii* - Koreanspice Viburnum**

Height 3-6'. Spread 3-6' (rounded dense shrub). Zones 4b-8a. Tolerant of high pH, but prefers moist; well drained slightly acid soil. Fragrant pink to white dusters of flowers in spring. Blue/black fruits are quickly devoured by birds in early summer. Dark green foliage turns wine/red in fall. Cultivars: 'Cayuga' (flowers in late April, leaves less susceptible to bacterial leaf spot and powdery mildew).

#### **\**Viburnum dentatum* - Arrowwood Viburnum**

Height 8-10'. Spread 8-10' (rounded, upright) Zones 4a-9a. Can withstand very poor drainage in heavy soils. pH adaptable. Tolerant of salt and drought. Grows well in full sun or shade. Grows from suckers. Easily transplanted. Creamy white flower clusters appear in late spring. Drooping clusters of black pea sized berries attract many gamebirds, songbirds and mammals in early fall. Cultivar: 'Chicago Luster' (shiny leaves).

#### ***Viburnum dilatatum* - Linden Viburnum**

Height 6-8'. Spread 4-8' (upright, rounded). Zones 5b-8b. All purpose shrub. Can withstand high pH soil, but requires evenly moist soils in full sun or partial shade. Outstanding creamy white flower clusters in spring develop in abundant blue/black fruit in fall. Quality green in late autumn. Trouble-free. Cultivars: 'Catskill' (compact growth habit), 'Iroquois' (large, thick textured, dark green, leaves), 'Oneida' (abundance of flowers in May).

#### ***Viburnum farreri* - Fragrant Viburnum**

Height 8-12'. Spread 8-12'. Zones 5a-8a. The foliage emerges bronzy-green and matures to dark green in summer changing to reddish/purple in fall. Fragrant flowers are pinkish/red in bud opening to white tinged with pink in mid-April. Annual pruning may be necessary to maintain fullness of form for use as a screen. Otherwise removal of deadwood and thinning every second or third year is sufficient.

#### ***Viburnum juddii* - Judd Viburnum**

Height 4-6'. Spread 4-6'..Zones . 4b-8a. pH adaptable, needs moist well drained soil conditions, full sun or partial shade. Hybrid of *V. carlesii* and *bitchiuense*. Open habit with fragrant, but smaller flower clusters. More resistant to leaf spot than *V. carlesii*. Black fruit in early summer.

#### ***Viburnum lantana* - Wayfaring Tree**

Height: 10-15'. Spread 10-15'. Zone 4a-7b. Adaptable to high pH and drought. Full sun to partial shade. Small white flowers in late spring, colorful berries in late summer-fall that attract birds. 'Mohican' is more compact than the species and resistant to leaf spot.

#### **\**Viburnum lentago* - Nannyberry Viburnum**

Height 20-35'. Spread 10-20'. Zone 2. Resistant to drought, heat and alkaline soils. Sensitive to salt. Transplants easily B&B in spring. Fragrant creamy white flowers emerge in late May. Leaves turn purplish red in fall. Black fruit is a valued winter food for the birds.

**Viburnum opulus - European Cranberrybush**

Height 8-10'. Spread 8-12' (rounded). Zones 3b-8b. Tolerant of high pH soils. Thrives in wet boggy situations and occasional drought Also drought and cold tolerant. Adaptable to partial shade though best fruiting is in full sun. Deep green maple-like leaves on branches arch to ground to provide distinctive texture. Flat white clusters appear in late May. Scarlet red fruit ripen in fall. Red/purple fall leaf color is not guaranteed. Aphids can be a problem. Cultivars: 'Compactum', 'Nanum'.

**Viburnum plicatum - Doublefile Viburnum var. tomentosum**

Height 8-10'. Spread (slightly greater than height). Zones 5b-8a\_ pH adapt-able. Must have moist well drained soil. Horizontal tiered branching distinguishes this plant from all others. White, non-fragrant, flower clusters are very showy. Quality textured leaves provide seasonal interest throughout summer. Good reddish/purple fall color makes this a plant for all seasons. Cultivars: Many. 'Mariesii' (large flowers), 'Shasta' (broad horizontal branches), 'Shoshone' ('Shasta' form at a smaller scale).

**Viburnum sargentii - Sargent Viburnum**

Height 12-15'. Spread 12-15'. Zones 4a-8b. pH adaptable. Not heat tolerant and is best suited to colder climates. White flowers appear in flat clusters in late May. Berry-like fruits are effective in August-October. More vigorous than V. opulus and more resistant to aphids. Cultivars: 'Onondaga' (velvety, dark maroon young foliage), 'Susquehanna' (dark green foliage, upright habit).

**\*Viburnum trilobum - American Cranberrybush Viburnum**

Height 6-12'. Spread 6-12'. Zones 2b-8b Will grow in poorly drained wet soils and tolerate a pH range of 6.6-7.5. Resistant to drought and heat. Sensitive to salt. Seasonal interests include white flowers in late May and red autumn color. Scarlet edible berries in fall and winter attract humans and birds alike. Cultivar: 'Compactum' (compact dwarf form).

**Viburnum sieboldii - Siebold Viburnum**

Height 15-20'. Spread 10-15' (upright). Zones 5b8a pH adaptable. Prefers moist well drained soil. Cannot withstand a drought without damaging leaves. Tolerates partial shade. Desirable long leaves (6') on open habit creates an interesting rounded plant mass. Creamy white flower clusters in May completely cover foliage. Unripe fruits are red for several weeks into the summer. After ripening, red stalks continue to hold the black fruit. Red fall leaf color is outstanding. Trouble-free. Cultivar: 'Seneca' (persistent red fruits, heavy flowering).

**W****Weigela florida - Old Fashioned Weigela**

Height 6-9'. Spread 9-12'. Zones 5a-9a. Extremely adaptable to pH and soil types, but prefers well drained soil and full sun. Considerable pruning is necessary to keep it in shape. Flowers May-June. Cultivars: Differ in flower color, shape and hardiness.

## Ground Covers:

### **Arctostaphylos uva-ursi - Bearberry**

Height 1' by 2-4' wide. Zones 3a-7a. Does well in sandy infertile soils. Full sun to partial shade. pH 4.5-5.5. Salt tolerant. Transplant containerized or as large mats. Excellent groundcover for bare sandy sites.

### **Diervilla sessilifolia - Southern Bush Honeysuckle**

Height 3-4'. Zones 4b-8a Amenable to a wide range of soils and moisture conditions. High pH, salt, sun. Good for bank plantings. Deep yellow, trumpet-shaped flowers in late June. Early to leaf out, late to drop its leaves. Very vigorous.

### **Forsythia 'Arnold's Dwarf' - Dwarf Forsythia**

Height 3'. Zone 4a (not flower bud hardy in zone 5). pH adaptable. Full sun, Transplants easily. Yellowish fall color, yellowish winter twig.

### **Hedera helix - English Ivy**

Height 12-24" Zones 5b-9a+. Growth is maximized in rich, fairly moist, organic, well drained soil. Some protection from full winter sun and wind is necessary at the northern edges of zone 5b to avoid winter drying foliage. Dark green, lustrous foliage clings to anything. Black fruits throughout winter. Susceptible to mite infestations.

### **Microbiota decussata - Siberian Cypress**

Height 12". Zones 2-3. Evergreen that is considered hardy to -44°F. Sun or partial shade. pH adaptable and drought tolerant once established. Purple foliage in winter.

### **Pachysandra terminalis - Japanese Pachysandra**

Height 6-12". Zones 5a-7b. Prefers moist, well drained acid soils abundantly supplied with organic matter pH 5.5-6.5 is ideal. Not only tolerates but requires shade from full sun for satisfactory performance. New foliage growth is light green turning deep dark green\_ Leaf blight and stem canker can be problems. Easily transplanted.

### **Potentilla fruticosa - 'Longacre' Cinquefoil**

Height 3'. Zones 2b-7b. Tolerant of salt, soil extremes and high pH. Bright lemon-yellow, clustered flowers in June. Shiny dark green foliage. See *Potentilla fruticosa*.

### **\*Rhus aromatica 'Gro-low' - 'Gro-low' Aromatic Sumac**

Height 2'. Zones 3b-9a\_ Tolerant of salt, high pH, drought, and heavy soils. Late to leaf out. Glossy green foliage turns orange/red in autumn. Fruits are often winter food for song and game birds.

### **Vinca minor - Common Periwinkle**

Height 3-6". Zones 4b-7b. Can tolerate poor soils, but will not develop and fill in as fast. Shade tolerant. Prefers moist well drained soil abundantly supplemented with organic matter. Can transplant bare root. Lilac blue flowers appear in March. Canker and dieback have been significant problems. Cultivar 'Alba' (white flowers).

## *The Shrub Roses:*

### **R. 'Meidiland' - Meidiland Rose**

Height 2-4'. Adaptable to high pH, but better growth under pH 7.5. Prefers full sun. Disease resistant. Flowers throughout summer and fall. Other low maintenance rose: Bonica, Carefree Beauty, Ferdy, Pink Meidiland, Scarlet Meidiland, 'Champlain', 'Charles Albanel', 'John Davis', 'J.P. Connell', 'Rugosa Ottawa', 'William Baffin'.

### **R. nitida - Shining Rose**

Height 3-4'. Zone 4a-6b. pH adaptable and disease free. Yellow fall color, red hips in winter, single pink flowers in June.

### **R. wichuraiana - Memorial Rose**

Height 1'. Zones 5b-9a. Semievergreen, vigorous, disease resistant. Sparse white flowers. Red fruit matures by October. Excellent for highway slopes and other banks.

### **Symphoricarpos x chenaultii - Chenault Coralberry**

Height 3-6'. Zone 5a-8b. Soil adaptable. Sun or partial shade. Fruit consists of small red berries, white on one side appearing in the fall. Drastic renewal pruning is necessary. Cultivars: 'Hancock' (low).

### **Symphoricarpos x doorenbosii - Coralberry**

Height 5-6'. Zones 5b-8b. Very tolerant of any soil. Native on limestone and clay. Will tolerate full sun to partial shade. Suckers profusely and tends to spread extensively. Susceptible to anthracnose, berry rot, powdery mil-dew, rust and scale. Prune in early spring so current season's growth can produce flowers. Cultivar: 'Magicberry' (mound forming).

## *List Prepared by:*

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## Shrubs Recommended for Various Site Conditions

Cornell Cooperative Extension of Monroe County, Article FS 1338

<b>Moisture: These plants tolerate poorly drained to intermittently flooded soils.</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Aesculus parviflora</i>	Bottlebrush Buckeye
<i>Amelanchier canadensis</i>	Shadblow Serviceberry
<i>Amelanchier laevis</i>	Allegheny Serviceberry
<i>Aronia arbutifolia</i>	Red Chokeberry
<i>Celastrus scandens</i>	American Bittersweet
<i>Chionanthus virginicus</i>	Fringetree/Old Man's Beard
<i>Cornus alba</i>	Tatarian Dogwood
<i>Cornus racemosa</i>	Gray Dogwood
<i>Cornus sericea</i>	Red Osier Dogwood
<i>Elaeagnus umbellata</i>	Autumn Olive
<i>Hamamelis vernalis</i>	Vernal Witch-hazel
<i>Ilex verticillata</i>	Winterberry/Black Alder
<i>Ligustrum amurense</i>	Amur Privet
<i>Sambucus canadensis</i>	American Elderberry
<i>Sorbaria sorbifolia</i>	Ural Falsespirea
<i>Thuja occidentalis</i>	American Arborvitae
<i>Viburnum dentatuni</i>	Arrowwood Viburnum
<i>Viburnum opulus</i>	European Cranberrybush
<i>Viburnum trilobum</i>	American Cranberrybush

<b>Moisture: These plants require moist but well drained soils.</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Amelanchier arborea</i>	Downy Serviceberry
<i>Comus kousa</i>	Japanese Dogwood
<i>Fothergilla gardenii</i>	Dwarf Fothergilla
<i>Fothergilla major</i>	Large Fothergilla
<i>Hamamelis x intermedia</i>	Hybrid Witch-hazel
<i>Hamamelis mollis</i>	Chinese Witch-hazel
<i>Hamamelis virginiana</i>	Common Witch-hazel
<i>Hydrangea quercifolia</i> 'Snow Queen'	Oakleaf Hydrangea 'Snow Queen'
<i>Ilex x meserveae</i>	Meserve or Blue Holly
<i>Viburnum burkwoodii</i>	Burkwood Viburnum

<i>Viburnum carlesii</i>	Koreanspice Viburnum
<i>Viburnum dilatatum</i>	Linden Viburnum
<i>Viburnum juddii</i>	Judd Viburnum
<i>Viburnum plicatum var. tomentosum</i>	Doublefile Viburnum
<i>Viburnum sieboldii</i>	Siebold Viburnum

**Moisture: Groundcovers - These plants require moist but well drained soils.**

<b>Latin Name</b>	<b>Common Name</b>
<i>Juniperus chinensis</i>	Chinese Juniper
<i>Hendra helix</i>	English Ivy
<i>Pachysandra terminalis</i>	Japanese Pachysandra
<i>Vinca minor</i>	Common Periwinkle

**Moisture: These plants tolerate moderate drought.**

<b>Latin Name</b>	<b>Common Name</b>
<i>Aronia arbutifolia</i>	Red Chokeberry
<i>Cercis canadensis</i>	Eastern Redbud
<i>Cornus alba</i>	Tartarian Honeysuckle
<i>Cotinus coggygria</i>	Smokebush
<i>Exochorda x macrantha</i>	Hybrid Pearlbush
<i>Forsythia x intermedia</i>	Border Forsythia
<i>Hamamelis virginiana</i>	Common Witch-hazel
<i>Kerria japonica</i>	Kerria
<i>Rhus typhina</i>	Staghorn Sumac
<i>Spiraea x vanhouttei</i>	Vanhoutte Spirea
<i>Weigela florida</i>	Old Fashioned Weigela

**Moisture: Groundcovers - These plants tolerate moderate drought.**

<b>Latin Name</b>	<b>Common Name</b>
<i>Microbiota decussata</i>	Siberian Cypress

**Moisture: These plants tolerate more severe drought.**

<b>Latin Name</b>	<b>Common Name</b>
<i>Aralia spinosa</i>	Devil's Walking Stick
<i>Berberis thunbergii</i>	Japanese Barberry
<i>Caragana arborescens</i>	Siberian Peashrub
<i>Celastrus orbiculatus</i>	Chinese Bittersweet

<i>Celastrus scandens</i>	American Bittersweet
<i>Cercis canadensis</i>	Eastern Redbud
<i>Cornus mas</i>	Cornelian Cherry
<i>Cornus racemosa</i>	Gray Dogwood
<i>Cornus sericea</i>	Red Osier Dogwood
<i>Elaeagnus umbellata</i>	Autumn Olive
<i>Euonymus alatus</i>	Burning Bush
<i>Hibiscus syriacus</i>	Rose of Sharon
<i>Hippophae rhamnoides</i>	Common Sea Buckthorn
<i>Juniperus horizontalis</i>	Creeping Juniper
<i>Juniperus sabina</i>	Savin Juniper
<i>Juniperus scopulorum</i>	Rocky Mountain Juniper
<i>Juniperus virginiana</i>	Eastern Redcedar
<i>Lonicera tatarica</i>	Tatarian Honeysuckle
<i>Myrica pensylvanica</i>	Bayberry
<i>Philadelphus coronarius</i>	Sweet Mockorange
<i>Potentilla fruticosa</i>	Bush Cinquefoil
<i>Primus maritima</i>	Beach Plum
<i>Prunus tomentosa</i>	Nanking or Manchu Cherry
<i>Rhamnus frangula</i>	Alder Buckthorn/Tallhedge
<i>Rhus typhina</i>	Staghorn Sumac
<i>Taxus baccata</i>	English Yew
<i>Taxus cuspidata</i>	Japanese Yew
<i>Taxus x media</i>	Anglojap Yew
<i>Thuja occidentalis</i>	American Arborvitae
<i>Viburnum dentatum</i>	Arrowwood Viburnum
<i>Viburnum lentago</i>	Nannyberry Viburnum
<i>Viburnum opulus</i>	European Cranberrybush
<i>Viburnum trilobum</i>	American Cranberrybush

**Moisture: Groundcover - These plants tolerate more severe drought.**

<b>Latin Name</b>	<b>Common Name</b>
<i>Diervilla sessilifolia</i>	Southern Bush Honeysuckle
<i>Forsythia 'Arnold's Dwarf'</i>	Arnold's Dwarf Forsythia
<i>Juniperus horizontalis</i>	Creeping Juniper
<i>Rhus aromatica gm-low</i>	Grow Low Sumac
<i>Symphoricarpos x doorenbosii</i>	Coralberry

<b>pH: The following plants require acid soil pH of 5.0-6.5</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Amelanchier canadensis</i>	Shadblow Serviceberry
<i>Chionanthus virginicus</i>	Fringetree/Old Man's Beard
<i>Clethra alnifolia</i>	Summersweet Clethra
<i>Fothergilla gardenii</i>	Dwarf Fothergilla
<i>Fothergilla major</i>	Large Fothergilla
<i>Hamamelis vernalis</i>	Vernal Witch-hazel
<i>Ilex verticillata</i>	Winterberry/Black Alder
<i>Ilex x meserveae</i>	Meserve or Blue Holly
<i>Magnolia virginiana</i>	Sweetbay Magnolia
<i>Stephanandra incisa</i>	Cutleaf Stephanandra

<b>pH: The following plants can tolerate acid to neutral soil pH of 5.0-7.4</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Amelanchier Spp.</i>	Serviceberry
<i>Amelanchier arborea</i>	Downy Serviceberry
<i>Cornus kousa</i>	Japanese Dogwood
<i>Hamamelis mollis</i>	Chinese Witch-hazel
<i>Hamamelis x intermedia</i>	Hybrid Witch-hazel
<i>Hamamelis virginiana</i>	Common Witch-hazel
<i>Viburnum x burkwoodii</i>	Burkwood Viburnum
<i>Pachysandra terminalis</i>	Japanese Pachysandra

<b>pH: The following plants can tolerate acid to alkaline soil pH of 5.0-8.0</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Aesculus parviflora</i>	Bottlebrush Buckeye
<i>Amelanchier alnifolia</i>	Saskatoon Serviceberry
<i>Aralia spinosa</i>	Devil's Walking Stick
<i>Exochorda x macrantha</i>	Hybrid Pearlbush
<i>Caragana arborescens</i>	Siberean Peashrub
<i>Celastrus scandens</i>	American Bittersweet
<i>Cercis canadensis</i>	Eastern Redbud
<i>Cornus alba</i>	Tatarian Dogwood
<i>Cornus mas</i>	Cornelian Cherry
<i>Cornus racemosa</i>	Gray Dogwood
<i>Comus sericea</i>	Red Osier Dogwood
<i>Cotinus coggygia</i>	Smoke Bush
<i>Forsythia x intermedia</i>	Border Forsythia

<i>Hydrangea quercifolia</i> 'Snow Queen'	Oakleaf Hydrangea Snow Queen
<i>Juniperus</i> SPP	Juniper
<i>Juniperus chinensis</i>	Chinese Juniper
<i>Juniperus horizontalis</i>	Creeping Juniper
<i>Juniperus sabina</i>	Savin Juniper
<i>Juniperus scopulorum</i>	Rocky Mountain Juniper
<i>Juniperus virginiana</i>	Eastern Redcedar
<i>Kerria japonica</i>	Kerria
<i>Kolkwitzia amabilis</i>	Beautybush
<i>Magnolia x soulangiana</i>	Saucer Magnolia
' <i>Magnolia x stellata</i>	Star Magnolia
<i>Philadelphus coronarius</i>	Sweet Mockorange
<i>Potentilla fruticosa</i>	Bush Cinquefoil
<i>Prunus x cistena</i>	Purpleleaf Sand Cherry
<i>Prunus maritima</i>	Beach Plum
<i>Prunus tomentosa</i>	Nanking or Manchu Cherry
<i>Ribes alpinum</i>	Alpine Currant
<i>Sambucus canadensis</i>	American Elder
<i>Spiraea x vanhouttei</i>	Vanhoutte Spirea
<i>Taxus baccata</i>	English Yew
<i>Taxus cuspidata</i>	Japanese Yew
<i>Taxus x media</i>	Anglojap Yew
<i>Thuja occidentalis</i>	American Arborvitae
<i>Viburnum carlesii</i>	Koreanspice Viburnum
<i>Viburnum dentatum</i>	Arrowwood Viburnum
<i>Viburnum dilatatum</i>	Linden Viburnum
<i>Viburnum juddii</i>	Judd Viburnum
<i>Viburnum lentago</i>	Nannyberry Viburnum
<i>Viburnum opulus</i>	European Cranberrybush
<i>Viburnum plicatum</i> var. <i>tomentosum</i>	Doublefile Viburnum
<i>Viburnum sargentii</i>	Sargent Viburnum
<i>Viburnum sieboldii</i>	Siebold Viburnum
<i>Weigela florida</i>	Old Fashioned Weigela

**pH: Groundcover - The following plants can tolerate acid to alkaline soil pH of 5.0-8.0**

<b>Latin Name</b>	<b>Common Name</b>
<i>Diervilla sessilifolia</i>	Southern Bush Honeysuckle
<i>Forsythia</i> 'Arnold's Dwarf'	Arnold's Dwarf Forsythia

<i>Microbiota decussata</i>	Siberian Cypress
<i>Potentilla fruticosa</i> 'Longacre'	Cinquefoil
<i>Rhus aromatica</i> 'Gro-Low'	Gro-Low Fragrant Sumac
<i>Rosa</i> 'Meidiland'	White Meidiland Rose
<i>Rosa nitida</i>	Shining Rose
<i>Rosa wichuraiana</i>	Memorial Rose
<i>Symphoricarpos x chenaultii</i>	Chenault Coralberry
<i>Symphoricarpos x doorenbosii</i>	Coralberry

<b>Salt Tolerance: The following plants tolerate salt.</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Aesculus parviflora</i>	Bottlebush Buckeye
<i>Caragana arborescens</i>	Siberean Peashrub
<i>Celastrus scandens</i>	American Bittersweet
<i>Clethra alnifolia</i>	Summersweet Clethra
<i>Cornus alba</i>	Tatarian Dogwood
<i>Elaeagnus umbellata</i>	Autumn Olive
<i>Hippophae rhamnoides</i>	Common Sea Buckthorn
<i>Hydrangea quercifolia</i> 'Snow Queen'	Oakleaf Hydrangea Snow Queen
<i>Myrica pensylvanica</i>	Bayberry
<i>Potentilla fruticosa</i>	Bush Cinquefoil
<i>Primus maritima</i>	Beach Plum
<i>Rhus typhina</i>	Staghorn Sumac
<i>Rosa rugosa</i>	Rugosa Rose
<i>Viburnum dentatum</i>	Arrowwood Viburnum
<i>Weigela florida</i>	Old Fashioned Weigela

<b>Salt Tolerance: Groundcovers - The following plants tolerate salt.</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Diervilla sessifolia</i>	Southern Bush Honeysuckle
<i>Potentilla fruticosa</i> 'Longacre'	Cinquefoil
<i>Rhus aromatica</i> 'Gro-Low'	'Gro-Low' Fragrant Sumac

<b>Salt Sensitivity: The following plants are sensitive to salt.</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Amelanchier laevis</i>	Allegheny Serviceberry
<i>Cercis canadensis</i>	Eastern Redbud
<i>Chionanthus virginicus</i>	Fringetree/Old Man's Beard

Hamamelis vernalis	Vernal Witch-hazel
Hamamelis virginiana	Common Witch-hazel
Hamamelis x intermedia	Hybrid Witch-hazel

## Complete List of Plants to Know

### Plants to be Identified

This is the complete pool of plants that the Plant ID portion of the CNLP Exam pulls from. You should be familiar with these plant families and the common cultivars.

Those highlighted in PINK are deemed INVASIVE by NYS and are Regulated or Banned from Sale or Transport within the state of New York.

<i>Large Trees - Deciduous:</i>	
<i>Latin Name</i>	<i>Common Name</i>
<i>Acer platanoides - Restricted NYS/ Banned LI</i>	Norway Maple
<i>Acer rubrum</i>	Red Maple
<i>Acer saccharum</i>	Sugar Maple
<i>Aesculus hippocastanum</i>	Common Horse Chestnut
<i>Betula papyrifera</i>	Paper Birch
<i>Catalpa speciosa</i>	Northern Catalpa
<i>Cercidiphyllum japonicum</i>	Katsura Tree
<i>Cladrastis lutea</i>	American Yellowwood
<i>Fagus grandifolia</i>	American Beech
<i>Fraxinus americana</i>	White Ash
<i>Fraxinus pennsylvanica</i>	Green Ash
<i>Ginkgo biloba</i>	Ginkgo/Maidenhair Tree
<i>Gleditsia triacanthos var. inermis</i>	Thornless Common Honeylocust
<i>Larix decidua</i>	European Larch
<i>Liquidambar styraciflua</i>	American Sweetgum
<i>Liriodendron tulipifera</i>	Tulip Tree
<i>Oxydendrum arboreum</i>	Sourwood
<i>Platanus x hybrida</i>	London Planetree
<i>Prunus serotina</i>	Black Cherry
<i>Quercus borealis</i>	Northern Red Oak
<i>Quercus coccinea</i>	Scarlet Oak
<i>Quercus macrocarpa</i>	Bur Oak
<i>Quercus phellos</i>	Willow Oak
<i>Quercus palustris</i>	Pin Oak
<i>Salix babylonica</i>	Weeping Willow
<i>Tilia cordata</i>	Littleleaf Linden
<i>Tilia tomentosa</i>	Silver Linden
<i>Ulmus americana</i>	American Elm
<i>Ulmus parvifolia</i>	Chinese Elm
<i>Zelkova serrata</i>	Japanese Zelkova

<b>Large Trees - Evergreen:</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Abies balsamea</i>	Balsam Fir
<i>Picea abies</i>	Norway Spruce
<i>Picea omorika</i>	Serbian Spruce
<i>Picea orientalis</i>	Oriental Spruce
<i>Picea pungens var. glauca</i>	Austrian Pine
<i>Picea nigra</i>	Colorado Blue Spruce
<i>Pinus strobus</i>	Eastern White Pine
<i>Pseudotsuga menziesii</i>	Douglas Fir
<i>Tsuga canadensis</i>	Canadian Hemlock
<i>Tsuga carolina</i>	Carolina Hemlock

<b>Small Trees:</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Acer campestre</i>	Hedge Maple
<i>Amelanchier arborea</i>	Downy Serviceberry
<i>Amelanchier canadensis</i>	Shadblow Serviceberry
<i>Amelanchier laevis</i>	Allegheny Serviceberry
<i>Carpinus betulus</i>	European Hornbeam
<i>Carpinus caroliniana</i>	American Hornbeam
<i>Cornus Florida</i>	Flowering Dogwood
<i>Crataegus phaenopyrum</i>	Washington Hawthorn
<i>Crataegus viridis</i>	Green Hawthorne
<i>Elaeagnus angustifolia</i>	Russian-olive
<i>Hamamelis virginiana</i>	Common Witchhazel
<i>Koelreuteria paniculata</i>	Golden Raintree
<i>Magnolia soulangeana</i>	Saucer Magnolia
<i>Malus</i>	Flowering Crabapple
<i>Prunus serrulata</i>	Japanese Flowering Cherry
<i>Pyrus calleryana cultivars (except 'Bradford')</i>	Callery Pear
<i>Syringa reticulata</i>	Japanese Tree Lilac

<b>Large Shrubs - Deciduous:</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Acer ginnala</i>	Amur Maple
<i>Acer palmatum</i>	Japanese Maple
<i>Cercis canadensis</i>	Eastern Redbud
<i>Chaenomeles speciosa</i>	Common Flowering quince
<i>Clethra alnifolia</i>	Summersweet Clethra
<i>Cornus kousa</i>	Kousa Dogwood
<i>Cornus mas</i>	Cornelian Cherry Dogwood
<i>Cornus sericea</i>	Red Osier Dogwood
<i>Cotinus coggygria</i>	Common Smoketree
<i>Euonymus alatus - NYS Invasive</i>	Winged Euonymus
<i>Forsythia x intermedia</i>	Border Forsythia
<i>Hibiscus syriacus</i>	Rose-of-Sharon
<i>Hydrangea paniculata</i>	Panicle Hydrangea
<i>Kolkwitzia amabilis</i>	Beautybush
<i>Lonicera tatarica - NYS Invasive</i>	Tatarian Honeysuckle
<i>Magnolia stellata</i>	Star Magnolia
<i>Philadelphus coronarius</i>	Sweet Mockorange
<i>Physocarpus opulifolius</i>	Ninebark
<i>Rhamnus cathartica - NYS Invasive</i>	Common Buckthorn
<i>Spiraea x vanhouttei</i>	Vanhoutte Spirea
<i>Syringa vulgaris</i>	Common Lilac
<i>Viburnum derriarturn</i>	Arrowwood Viburnum
<i>Viburnum opulus</i>	European Cranberrybush

<b>Large Shrubs - Evergreen:</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Ilex aquifolium</i>	English Holly
<i>Ilex verticillata</i>	Common Winterberry
<i>Ilex meserveae</i>	Meserve Holly
<i>Rhododendron catawbiense</i>	Catawba Rhododendron
<i>Rhododendron maximum</i>	Rosebay Rhododendron
<i>Thuja occidentalis</i>	American Arborvitae
<i>Thuja orientalis</i>	Oriental Arborvitae
<i>Thuja plicata</i>	Western Arborvitae

<b>Small Shrubs - Deciduous:</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Berberis thunbergii</i> - NYS Invasive	Japanese Barberry
<i>Buddleia davidii</i>	Butterfly Bush
<i>Deutzia gracilis</i>	Slender Deutzia
<i>Caryopteris x clandonensis</i>	Blue Mist Spirea
<i>Cotoneaster horizontalis</i>	Rockspray Cotoneaster
<i>Hydrangea arborescens</i>	Smooth Hydrangea
<i>Hydrangea macrophylla</i>	Bigleaf Hydrangea
<i>Hydrangea quercifolia</i>	Oakleaf Hydrangea
<i>Potentilla fruticosa</i>	Bush Cinquefoil
<i>Prunus x cistena</i>	Purpleleaf Sand Cherry
<i>Prunus laurocerasus</i>	Common Laurelcherry
<i>Rosa rugosa</i>	Rugosa Rose
<i>Spiraea x bumalda</i>	Bumalda Spirea
<i>Vaccinium corymbosum</i>	Highbush Blueberry
<i>Viburnum carlesii</i>	Koreanspice Viburnum
<i>Weigela florida</i>	Old Fashioned Weigela

<b>Small Shrubs - Evergreen:</b>	
<b>Botanical Name</b>	<b>Common Name</b>
<i>Buxus sempervirens</i>	Boxwood
<i>Ilex crenata</i>	Japanese Holly
<i>Ilex glabra</i>	Inkberry
<i>Juniperus species</i>	Juniper
<i>Kalmia latifolia</i>	Mountain Laurel
<i>Leucothoe fontanesiana</i>	Drooping Leucothoe
<i>Mahonia aquifolium</i>	Oregon Grapeholly
<i>Myrica pensylvanica</i>	Northern Bayberry
<i>Picea abies 'Nidiformis'</i>	Birds Nest Spruce
<i>Pieris japonica</i>	Japanese Pieris
<i>Pinus mugo var. mugo</i>	Mugo Pine
<i>Rhododendron (Azalea hybrid)</i>	Evergreen Azalea

<b>Groundcovers:</b>	
<b>Botanical Name</b>	<b>Common Name</b>
<i>Ajuga reptans</i>	Bugleweed
<i>Juniperus horizontalis</i>	Creeping Juniper
<i>Pachysandra terminalis</i>	Japanese Pachysandra
<i>Vinca minor</i>	Common Periwinkle

<b>Vines:</b>	
<b>Botanical Name</b>	<b>Common Name</b>
<i>Clematis species</i>	Clematis
<i>Euonymus fortunei</i> - NYS Invasive	Wintercreeper Euonymus
<i>Hedera helix</i>	English Ivy
<i>Hydrangea anomala ssp. petiolaris</i>	Climbing Hydrangea
<i>Lonicera japonica</i> - NYS Invasive	Japanese Honeysuckle
<i>Parthenocissus quinquefolia</i>	Virginia Creeper
<i>Parthenocissus tricuspidata</i>	Boston Ivy
<i>Wisteria sinensis</i>	Chinese Wisteria

<b>Herbaceous Perennials:</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Achillea x 'Coronation Gold'</i>	Coronation Gold Yarrow
<i>Anemone x hybrida 'Hononne Jobert'</i>	Honorine Jobert Japanese Anemone
<i>Aquilegia hybrida</i>	Columbine
<i>Baptisia australis</i>	Blue Wild Indigo
<i>Brunnera macro phylla</i>	Brunnera
<i>Campanula glomerata 'Joan Elliott'</i>	Clustered Bellflower
<i>Chrysanthemum x Superbum</i>	Shasta Daisy
<i>Chrysanthemum x morifolium</i>	Chrysanthemum
<i>Coreopsis verticillata 'Moonbeam'</i>	Thread Leaf Coreopsis
<i>Echinacea purpurea 'Magnus'</i>	Purple Coneflower
<i>Helleborus niger</i>	Christmas Rose
<i>Hemerocallis sp.</i>	Daylily
<i>Hibiscus moscheutos 'Southern Belle'</i>	Hibiscus
<i>Ligularia stenocephala 'The Rocket'</i>	Narrow-spiked Ligularia
<i>Lobelia cardinalis</i>	Cardinal Flower
<i>Monarda didyma</i>	Bee-balm
<i>Paeonia lactiflora</i>	Peony
<i>Perovski atriplicifolia</i>	Russian Sage
<i>Phlox paniculata 'David'</i>	Garden Phlox

<i>Primula x polyantha</i>	Polyantha Primrose
<i>Rudbeckia x 'Goldsturm'</i>	Black-eyed Susan

<b>Ornamental Grasses:</b>	
<b>Botanical Name</b>	<b>Common Name</b>
<i>Calamagrostis acutiflora 'Overdam'</i>	Feather Reed Grass
<i>Chasmanthium latifolium</i>	Northern Sea Oats
<i>Elymus arenarius Glaucus'</i>	Blue Lyme Grass
<i>Helictotrichon sempervirens</i>	Blue Oat Grass
<i>Miscanthus sinensis 'Gracillimus' - NYS Regulated / LI Banned</i>	Maiden Grass
<i>Miscanthus sinensis var. strictus - NYS Regulated / LI Banned</i>	Banded Miscanthus
<i>Miscanthus sinensis Purpurascens' - NYS Regulated / LI Banned</i>	Flame Grass
<i>Miscanthus sinensis Variegatus' - NYS Regulated / LI Banned</i>	Variegated Japanese Silver Grass
<i>Panicum virgatum 'Rehbraun'</i>	Deer Red Brown Switch Grass
<i>Panicum virgatum 'Heavy Metal'</i>	Heavy Metal Switch Grass
<i>Pennisetum alopecuroides</i>	Fountain Grass
<i>Pennisetum alopecuroides 'Hameln'</i>	Hameln Fountain Grass
<i>Phalaris arundinacea 'Feesey's Form'</i>	Feesey's Form Ribbon Grass
<i>Spodiopogon sibiricus</i>	Frost Grass

<b>Bulbs:</b>	
<b>Botanical Name</b>	<b>Common Name</b>
<i>Crocus</i>	Crocus
<i>Stembergia</i>	Daffodil
<i>Tulipa</i>	Tulip

<b>Flowering Annuals:</b>	
<b>Latin Name</b>	<b>Common Name</b>
<i>Ageratum houstonianum</i>	Ageratum
<i>Coleus blumei</i>	Coleus
<i>Cosmos bipinnatus</i>	Cosmos
<i>Impatiens sultana</i>	Impatiens
<i>Pelargonium Hortorum</i>	Geranium
<i>Petunia hybrida</i>	Petunia
<i>Targetes patula</i>	Marigold
<i>Viola tricolor</i>	Pansy
<i>Zinnia elegans</i>	Zinnia

## Chapter 3 - Identifying Characteristics of Plants - Review

Be prepared to identify or define the following parts of a plant:

Leaf Type and Parts:	Leaf Arrangement:	Leaf Shapes:
Blade	Alternate	Awl like
Bud	Opposite	Cordate
Compound	Whorled	Deltoid
Lamina		Elliptical
Leaflets		Lanceolate
Main Vein	Leaf Form:	Linear
Petiole	Broad	Needle like
Rachis	Needle	Ovate
Secondary vein	Even pinnate	Palmately lobed
Simple	Odd pinnate	Pinnately lobed
Step	Palmate	Scale like
Stipule		Spatulate

Leaf Bases:	Leaf Margins:	Venation:
Acuminate	Crenate	Arcuate
Acute	Dentate	Dichotomous
Cordate	Entire	Palmate
Truncate	Lobed	Parallel
Sagittate	Serrate	Pinnate
	Sinuate	
	Undulate	

Winter Twig Characteristics:	
Bud scale scar	Lenticel
Lateral bud	One year growth
Leaf scar	Terminal bud

Flower:		
Anther	Monoecious	Imperfect flower
Calyx	Ovary	Incomplete Flower
Complete flower	Pedice	Polygamous
Corolla	Perfect Flower	Sepals
Dioecious	Petals	Stamen
Filament	Pistil	
Inflorescences:		
Catkin	Solitary	
Corymb	Spike	
Panicle	Umbel	
Solitary	Style	
Spike		

Slightly revised for the New York State Nursery and Landscape Association by:

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## Suggested Readings:

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