

A3864

Choosing the right landscape plants

FACTORS TO CONSIDER

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PROPERLY PLACED AND CARED FOR LANDSCAPE PLANTS CAN INCREASE THE VALUE OF REAL ESTATE. HOWEVER, POOR PLANT CHOICES CAN BECOME A MAINTENANCE PROBLEM AND CREATE AN UNSIGHTLY LANDSCAPE. MISMATCHED CULTURAL REQUIREMENTS, IMPROPER PLANTING (TOO DEEP), AND VANDALISM ACCOUNT FOR MORE TREE AND SHRUB DEATHS THAN ALL INSECT AND DISEASE-RELATED DEATHS COMBINED. ALWAYS STRIVE TO PLANT THE RIGHT PLANT IN THE RIGHT PLACE.





PLANT SELECTION IS ONE OF THE MOST IMPORTANT DECISIONS A GARDENER, LANDSCAPER, OR DESIGNER MAKES WHEN LANDSCAPING.

Questions to consider are:

- What plants are adapted to my climate?
- How is the plant to be used in the landscape?
- What are the space considerations of the site?
- How big does the plant get and how fast does it grow?
- Does the plant have showy flowers and fruit?
- Is the foliage colorful during the growing season or in autumn?
- Does the plant have interesting bark or branches?
- What cultural requirements does it need?
- Is the plant susceptible to insects or diseases?
- Is the plant sensitive to air pollution or deicing salts?
- What type of landscape maintenance am I willing to provide?
- Are there any regulations or local ordinances preventing me from planting?
- What existing vegetation exists in the area? Are there any invasive plants?
- How do I know if I am purchasing high-quality nursery stock?

These questions, along with the selection criteria discussed in this publication, should provide the basis for your landscape plant choices. Choosing the proper plants for a landscape help to ensure the plant has the best chance for healthy growth, development, and long-term survival.

Climatic considerations

CLIMATE

Climate is perhaps the most important factor when choosing landscape plants. The ability of a plant to adapt to a given climate is referred to as hardiness; it involves tolerance to both low and high temperatures. It is very important to use species that can survive the temperature extremes of your location. If the plant is not tolerant to your particular winter conditions, a perennial will perform like an annual and die over winter.

WHAT PLANTS ARE ADAPTED TO MY CLIMATE?



Urban areas usually are slightly warmer than rural areas due to the “heat island” effect created by heat from sewers and furnaces. Heat that is trapped and sheltered by buildings and streets also contributes to this effect. In addition, unique microclimates can be created at specific sites. For example, trees planted close to black asphalt pavement will have warmer conditions in summer and will probably need more water than those same plants planted in the middle of a park area. Some areas also may be subject to early and late frosts, particularly sites at higher elevations and those in low areas or frost pockets. In light of these differences, two very important climatic adaptability criteria to consider when choosing plants are USDA Cold Hardiness Zones and American Horticultural Society (AHS) Heat Zones.



NOTE: This publication identifies plants by their common names; if you’re interested in learning more about a given plant, you may wish to refer to the list on pages 20 and 21 for the full scientific name to ensure that you’re looking up the same plant.





CHOOSING THE RIGHT LANDSCAPE PLANTS

COLD HARDINESS

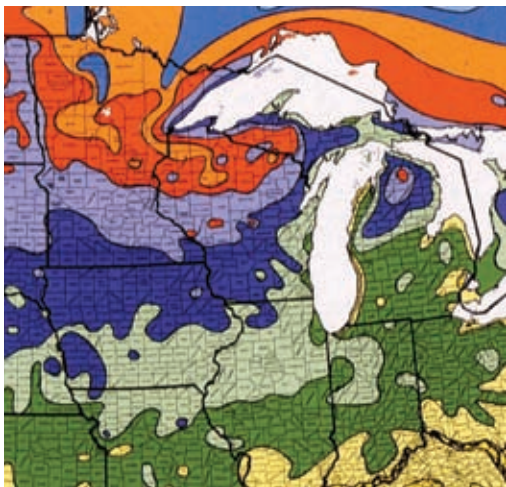
USDA cold hardiness zones are based on the range of average annual minimum winter temperatures. Lower zone numbers indicate colder climates; higher numbers indicate warmer climates. Wisconsin has three cold hardiness zones: zone 3 (northern Wisconsin), zone 4 (central and southwestern Wisconsin), and zone 5 (southeastern Wisconsin). The hardiness zones are further divided into two sub-zones of either "a" (the colder half of the hardiness zone) or "b" (the warmer). For example, the hardiness zone in Portage, Wisconsin, is zone 4b while Stevens Point, Wisconsin, is in zone 4a. This means that a zone 4 hardy plant is cold hardy to -20°F to -30°F with further division of this zone into zone 4a (hardy -25°F to -30°F) or zone 4b (hardy -20°F to -25°F).

This subdivision is critical for estimating cold hardiness of some woody plants. When in doubt as to whether you are in the "a" or "b" part of a cold hardiness zone, it is better to err on the side of plants that are hardy to the colder "a" zone. Winter hardiness is crucial in plant selection, health, and survival. Lack of hardiness can lead to dieback, decline in plant health, death of flower buds, or damage or destruction to the entire plant. For example, the flower buds of border forsythia are not cold hardy to zone 4b but the flower buds of Sunrise forsythia are cold hardy; therefore, choosing cultivars and species that are hardy to your area is crucial. Many horticultural reference and gardening books and plant labels now list the subdivision of the zones ("a" and "b"). When in doubt, ask a local nursery or garden center for appropriate plants for your area or contact your local county Extension office for further information.

HEAT TOLERANCE

American Horticultural Society Heat Zones are based on average annual days that are above 86°F . Wisconsin has four heat zones: zone 2 (northeastern Wisconsin along the Upper Peninsula of Michigan border), zone 3 (north central Wisconsin and Door County), zone 4 (most of western, central, and eastern Wisconsin), and zone 5 (extreme southern and western Wisconsin). Heat zones are particularly important in the southern and western U.S., but also are important in the northern U.S. For example, paper birch and pagoda dogwood, species preferring heat zones below 5, are not suitable in some parts of southern Wisconsin, especially in urban areas, and will not thrive in those locations. They are cool, woodland species native to northern Wisconsin. They become susceptible to insects, such as bronze birch borer (birch) or golden canker (dogwood) when grown in the poor, dry soils and high temperature extremes common in urban and some suburban environments.

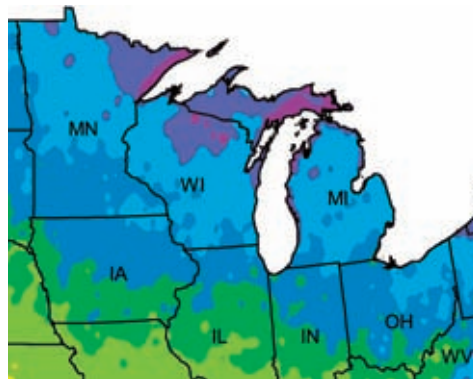
USDA COLD HARDINESS ZONES



Average annual minimum winter temperatures

3a	-35° to -40°F
3b	-30° to -35°F
4a	-25° to -30°F
4b	-20° to -25°F
5a	-15° to -20°F
5b	-10° to -15°F

AMERICAN HORTICULTURAL SOCIETY PLANT HEAT ZONE MAP



Average number of days per year above 86°F

2	1–7 days
3	8–14 days
4	15–30 days
5	31–45 days
6	46–60 days
7	61–90 days

Reproduced with permission of the American Horticultural Society (www.ahs.org).

High temperatures are important because they affect the supply of carbohydrates (sugars) plants manufacture for themselves during the day by photosynthesis. Plants use stored carbohydrates to produce new leaves, shoots, roots, and fruit. Sugars are also involved in several physiological processes, and generate important plant pigments, such as anthocyanin (red, purple, and blue pigments). When plants with poor heat tolerance are grown in regions that routinely experience high summer day and night temperatures, they often “burn up” much of their supply of stored carbohydrates during the evening hours.

These conditions occur not only in warmer areas of the U.S., but can also take place in urban environments, containers, and city boulevards. Plants like the purple-leaf beech offer an example. The tree has purple leaves during the cooler parts of spring and early summer, but when excessively high temperatures occur in warmer heat zones of 6 and higher, respiration rates at night increase and there are not enough carbohydrates (sugars) left over for purple pigment to develop. The leaves can fade to a greenish-purple. This does not harm the plant but defeats the purpose of growing this purple-leaved tree in the first place.

Some trees will die due to excessively high temperatures. Heat also increases susceptibility to insects and diseases, especially wood-boring insects and root rots. In these microclimates, the stored carbohydrates are used for nighttime respiration, leaving little for defense against pests. Generally, for most residential locations, you do not have to worry about heat tolerance unless a species specifically requires a cooler or shady environment with adequate moisture.



EASTERN REDBUD

PROVENANCE (GEOGRAPHIC SEED SOURCE)

One other important adaptability criteria to consider when choosing plants is provenance. Provenance refers to the geographic origin of the seed. Provenance is not an issue for vegetatively propagated (via cuttings, budding/grafting, tissue culture, layering) species and cultivars, but it is very important for some native and exotic species that have a wide, native geographic range and are primarily propagated by seed.

You may not know whether a nursery or garden center has obtained seed-propagated plant material from a northern seed source, but you can try asking. For example, eastern redbud is native from New Jersey to northern Florida, and west to Illinois and northern Mexico. Some growers have been known to collect seed or buy nursery stock of eastern redbud trees growing in southern U.S. locations, such as Tennessee, and sell them in northern markets. These seed-propagated, southern provenances of eastern redbud are less cold hardy and require a shorter dormancy to break bud. Consequently, plants grown from southern seed sources are prone to winter damage and may break bud early in spring, making them vulnerable to frost damage.

In contrast, the more northern provenances have greater cold hardiness and should be chosen for use in the Upper Midwest when propagating or growing species such as eastern redbud. This may also hold true for non-native, exotic species.

TREES BEST GROWN FROM NORTHERN SEED SOURCES

SCIENTIFIC NAME	COMMON NAME
<i>Acer rubrum</i>	Red maple
<i>Asimina triloba</i>	Pawpaw
<i>Betula nigra</i>	River birch
<i>Carpinus caroliniana</i>	American hornbeam or musclewood
<i>Cercis canadensis</i>	Eastern redbud ^a
<i>Cornus florida</i>	Flowering dogwood
<i>Fagus grandifolia</i>	American beech
<i>Liriodendron tulipifera</i>	Tuliptree, tulip-poplar
<i>Morella</i> (formerly <i>Myrica</i>) <i>pensylvanica</i>	Northern bayberry
<i>Nyssa sylvatica</i>	Black gum, tupelo
<i>Pinus ponderosa</i>	Ponderosa pine
<i>Pseudotsuga menziesii</i> var. <i>glauca</i>	Douglas-fir
<i>Quercus</i> spp.	Oaks (most)
<i>Sassafras albidum</i>	Sassafras
<i>Taxodium distichum</i>	Baldcypress

^aRedbuds sold as “Columbus strain” or “Minnesota strain” come from a northern provenance.

? HOW IS THE PLANT TO BE USED IN THE LANDSCAPE?

The plant's function in the landscape

The functional use of a plant in the landscape is a central consideration when making plant choices. Plants can function in multiple ways in the landscape; this can make your choice even more difficult. Pay attention to the particular features of different plants; these may give you ideas about where in the landscape they might best be put to use. Here are some guidelines.

SHADE TREES

How dense do you want your shade to be? Trees that produce dense shade, such as maples and oaks, should be planted where there is enough space, as well as sunlight. These species work well on the southeast, southwest, and west sides of buildings and homes by providing cool shade in summer, which can significantly lower your cooling costs. Deciduous trees drop their leaves in autumn which allows for the low, winter sun to shine through your windows, bringing heat and light into the home.

STREET TREES

Trees that are to be planted along a street should tolerate heat, drought, poor drainage and aeration, soil compaction, low fertility, high pH, deicing salts, and air pollution. They should also be cold hardy to your area and resist pests. Street trees often suffer greatly due to lack of water and restricted rooting area; hence, selection of an appropriate species is important for the tree's growth and survival. Maybe the best choice is not to plant a tree, but to select herbaceous perennials or annuals.

When planting a street tree, remember to "look up" for power lines and avoid planting species that get large at maturity (taller than 30 ft.) near utilities. For example, many maples, oaks, honeylocusts, and lindens get too tall to plant near power lines. However, if power lines are not a problem and sufficient rooting area is provided, many of these trees make good street tree choices. Some oaks can make good street trees if the acorn litter in autumn is not a serious issue.

SPECIMENS

A specimen plant can stand alone in the landscape and serve as a focal point. The plant's ornamental characteristics draw your attention to it. It may have a unique form or texture, showy foliage, flowers, fruit, or interesting bark or branching. A specimen plant can be combined with other plants in mixed shrub or herbaceous perennial borders. Many small, ornamental trees are specimen plants such as flowering crabapple and Japanese tree lilac.



IVORY SILK JAPANESE TREE LILAC

SCREENS

Plants can be used to eliminate an undesirable view, smell, block noise, or trap dust and debris from roads. They also outline space and create outdoor spaces or "rooms" in the landscape and provide privacy. Usually, a single species with a dense habit is planted in a row, preferably evergreens with low branches. Sometimes berms (elongated mounds) are used to screen views. The plants can be sheared into a tall hedge (see next page under hedge), or allowed to spread naturally. Most evergreen trees such as pines, spruce, fir, Douglas-fir, eastern hemlock, northern white-cedar, and eastern red-cedar look best if allowed to grow naturally and can serve as very effective screening plants in the landscape.

GOOD CHOICES FOR STREET TREES

SCIENTIFIC NAME COMMON NAME

Short trees (suitable near power lines)

Malus spp. Flowering crabapples

Syringa reticulata Japanese tree lilac

Tall trees (not suitable near power lines)

Acer miyabei 'Morton' State Street® Miyabe maple

Acer x freemanii Freeman maple

Ginkgo biloba Ginkgo (male cultivars)

Gleditsia triacanthos var. *inermis* Honeylocust (male cultivars)

Quercus muehlenbergii Chinkapin oak

Taxodium distichum Baldcypress

Tilia spp. Lindens

Ulmus spp. Elms (hybrids)



COMPACT AMERICAN CRANBERRYBUSH VIBURNUM

WINDBREAKS

Plants can serve to reduce the force of the wind. Windbreaks are often made up of one species planted in a single row, or multiple species planted in several rows. Evergreens are a better choice for windbreaks as they retain their leaves in winter when cold winds are at their worst. Evergreens also serve as a screen to block views (see above under screen). Evergreen windbreaks can provide cover for wildlife, particularly in winter.

HEDGES

A hedge is a living green fence usually consisting of one species, often planted close together in a single or double row with alternate spacing. Hedges help define or divide portions of your property or direct pedestrian traffic. They can be ornamental or defensive (barrier) and can be trimmed to produce a tight, formal appearance or allowed to grow naturally, creating an informal effect. Evergreens used as hedge plants can also serve as a screen.

For formal hedges, choose evergreen species that can tolerate shearing and have dormant buds along the stem that can break and re-grow. Such species include boxwood, yews, arborvitae or white-cedar, or eastern hemlock. Avoid use of junipers, spruces, and most pines in tightly clipped hedges as these plants grow mainly from the tips of branches where the buds are formed. Yearly, repeated trimming of these shrubs to the same point will result in dead tissue, unsightly plants, and poor performance.

Do not shear ornamental flowering shrubs such as forsythia, lilacs, dogwoods, or spirea into formal hedges, as you will be removing flower buds. Flower buds are commonly formed in mid to late summer for the following spring season. These and other deciduous or evergreen species can be used as informal hedges where their natural shape is retained and they are not sheared. Avoid the use of tall hedge buckthorn and Tatarian honeysuckle as hedge plants. Both species are highly invasive in woodlands, prairies, and wetlands.

BARRIERS

A barrier plant is typically a defensive hedge to keep objects away and deter foot traffic. Barrier plants usually have thorns or are quite twiggy, with sharp branches. Shrub roses, barberry, and hawthorn are some examples of plants that make effective barriers.



HEDGES, BARRIERS, AND SCREENS

SCIENTIFIC NAME COMMON NAME

Screens (best if allowed to grow naturally)

<i>Abies</i> spp.	Firs
<i>Juniperus virginiana</i>	Eastern red-cedar
<i>Picea</i> spp.	Spruces
<i>Pinus</i> spp.	Pines
<i>Pseudotsuga menziesii</i> var. <i>glauca</i>	Douglas-fir
<i>Thuja occidentalis</i>	Arborvitae, white-cedar
<i>Tsuga canadensis</i>	Eastern hemlock

Formal hedges (tolerates shearing)

<i>Buxus</i> spp.	Boxwoods
<i>Taxus</i> spp.	Yews
<i>Thuja occidentalis</i>	Arborvitae, white-cedar
<i>Tsuga canadensis</i>	Eastern hemlock

Informal hedges (do not shear)

<i>Cornus</i> spp.	Dogwoods
<i>Forsythia</i> spp.	Forsythias
<i>Spiraea</i> spp.	Spireas
<i>Syringa</i> spp.	Lilacs

Barriers

<i>Berberis</i> spp.	Barberries
<i>Crataegus</i> spp.	Hawthorns
<i>Rosa</i> spp.	Shrub roses





BORDER
(ALPINE CURRANT)

BORDERS

Shrub borders are often planted along the perimeter of a house or in landscape beds that define boundaries; for example, the line between your yard and your neighbor's. You can create a mixed border using both woody and herbaceous perennials.

EDGING

Edging refers to planting of low-growing species along the margin of a landscape bed, helping to define a border. It can comprise one or more species and the plants typically grow less than 3 feet tall. Boxwood and Crimson Pygmy Japanese barberry are commonly used for edging.

FOUNDATION

Foundation plants can be individual plants or combinations of plants placed next to homes and buildings to soften the structure. To allow access to windows and clearance near awnings, plants selected as foundation plants usually grow lower than 6 feet tall. Plant taller or wide-spreading trees and shrubs away from windows and entranceways to allow people to pass.

MASSES

A mass planting consists of a number of plants, either the same or a combination of species, planted close together that often screen a view. If they are tall enough, masses can provide a windbreak. Both evergreens and flowering shrubs can be used in masses. Make sure you do not crowd the plants together as plants placed too close together will shed their inner leaves and branches to compensate for reduced light levels.

GROUNDCOVER

A groundcover is a flat or trailing plant that spreads along the ground. It creates the "floor" of the landscape and can help prevent erosion and stabilize slopes or banks. Some groundcovers can tolerate deep shade like Japanese pachysandra, while others require full sun like junipers. Groundcovers are usually evergreen, but there are some flowering groundcovers such as sweet woodruff and creeping phlox.

VINE

Vines climb by special adaptations such as tendrils, tendrils with adhesive discs at the tips, rootlets (adventitious roots), or by twining around a structure or fence. Vines create the "walls" and "ceilings" of the landscape as they can be used on walls, trellises, or allowed to grow over arbors or pergolas. Some vines, such as Oriental bittersweet and English ivy, are invasive and choke out trees and other plants as they climb over them. Avoid planting these species. American bittersweet is a good alternative, native, non-invasive vine that can be used instead of Oriental bittersweet. Some vines have beautiful flowers such as Kentucky wisteria and sweet autumn clematis.

CONTAINER PLANTS

Some shrubs and a few, smaller trees can be grown outdoors in insulated containers, provided they receive enough light with consistent watering, adequate drainage, and pruning during the growing season. Containers can be used in tight spaces, on patios, decks, or in areas where a splash of color is needed. A few trees that can be grown in containers include Cinderella®, Firebird®, and Tina crabapples.



FOUNDATION
(SAYBROOK
GOLD JUNIPER)



Size, form, and growth rate considerations

When making your plant selection, it's important to think about how tall and wide the plant will ultimately become and whether it will still fit your space years later.

SIZE

Trees and shrubs typically are planted when young. Take care to consider how their growth will impact the landscape in the future. Too often, the mature height and width of tree and shrub branches and roots are not taken into consideration. Utility lines, both above and below ground, sewers, light posts, sidewalks, roads, and other structures should be considered as you decide how large a tree or shrub to plant. Power and construction companies will be forced to prune back your plants if they are too large and become an obstruction. Also, remember vehicular and pedestrian traffic. More maintenance pruning will be required to prevent obstruction of view and unsafe conditions such as thorny or prickly foliage that extends over the street or sidewalk, messy fruit that creates slippery walkways, and spreading branches that prevent drivers from seeing traffic.

Avoid crowding plants together or planting trees too close to buildings, even though this may be visually appealing at first. You will eventually have to remove or relocate plants that get too big for the area. Large trees planted too close to a building can cause infrastructure or foundation damage from the roots and branches and become a liability.



HOW BIG DOES THE PLANT GET AND HOW FAST DOES IT GROW?

FORM

You need to be aware of the plant's form and branching characteristics. (Common plant forms are pictured on pages 8 and 9.) Form and branching refers to the plant's overall size, shape, and outline. For narrow spaces, choose plants that have a columnar or fastigiate form, with larger, vase-shaped or spreading trees in bigger areas. Most trees are pyramidal when young and become rounded or open with age. In general, pick trees that have a balanced and attractive branch pattern. Look for wide crotch angles between the branches and the main trunk of the tree to avoid large limb breakage later. Don't forget to consider the size of the root system of the mature plant. Roots often require more space than most people think.

GROWTH RATE

A plant's genetic makeup, the length of the growing season, and the attention given to the plant's culture will determine how quickly a tree or shrub grows. A fast-growing tree may be important when planting for shade or screening. However, some fast-growing species have weak wood, poor branch attachment, and are prone to storm breakage. Silver maples, willows, and Siberian elm are subject to this problem and need more frequent pruning. Slow-growing trees and shrubs such as ginkgo and Koreanspice viburnum may be beneficial near streets and homes, because of fewer maintenance (pruning) requirements.

DIFFERENT PLANT FORMS

ARCHING: Branches on tree or shrub arch over, creating a fountain or cascading look.



CLIMBING: Stems of a plant grow upwards along a fence, trellis, wall, or other structure; common in vines.



CLUMP: Main branches or multiple trunks of a tree arise from the base of the plant. Common in ornamental trees that have showy bark; nurseries intentionally grow them this way.



COLUMNAR: Branches are closely arranged on the stem creating a narrow, vertical habit. Narrower growth than fastigate.



CONICAL: Geometric cone-shape (like an upside-down ice cream cone), common in evergreens.



CREEPING OR TRAILING: Branches and foliage lay close to the ground or trail over walls or boulders; common in groundcovers.



DENSE: More compact form than typical; branches and foliage are close together, unable to see through.



DWARF: Miniature form, much smaller than usual; common in conifers.



ERECT: Upright, with tall, straight stems; can also refer to columnar or fastigate forms. Usually used to describe shrubs.



FASTIGIATE: Narrow, upright branching with closely arranged branches. Growth is less tight than columnar.



HORIZONTAL: Branches are parallel to the ground, creating a wide-spreading, flat-topped look.



IRREGULAR: No distinct shape, but form can be picturesque.



MOUNDED: Low, rounded form, close to ground.



PYRAMIDAL: Somewhat triangular in outline. Base is widest part and narrows at top; formal looking.



UPRIGHT: Branches tend to go upwards and are often rigid.



OPEN: Branches are far enough apart to allow air and light through—you can see through it.



ROUNDED OR GLOBULAR: Curved outline; top of plant resembles the upper half of a circle, common in trees.



VASE-SHAPED: Upper part of a tree canopy or shrub outline is shaped like a V.



WEeping: Stems of a tree or shrub gracefully arch or bend over toward the ground. Often grafted.



SPREADING: Branches spread upward and outward; common in trees or larger shrubs.



OVAL: Egg-shaped; lower and upper portions of plant are narrower than the middle.



SUCKERING: Multiple stems originate below ground from the roots, resulting in new shoots, common in shrubs.





DOES THE PLANT HAVE SHOWY FLOWERS AND FRUIT?

Ornamental considerations

In terms of overall ornamental impact, it's generally considered best to choose plants with year-round interest. While a plant's flowers are often the main reason why people select a particular plant, also look at features that will be present at other times of the year.

FLOWERS

The time, duration, color, fragrance, and showiness of flowers are important aesthetic features. Most woody plants flower in the spring, a few species flower in the summer, and even fewer flower in the autumn or winter. You can produce a wonderful effect in the landscape when you choose a variety of plants with different flowering times, so that something is nearly always in bloom. Many flowers bloom in spring, but summersweet clethra, hydrangeas, and clematis are species that flower in summer. Many shrub roses and common witchhazel flower into autumn.

The duration of bloom varies dramatically with each plant. Nevertheless, most flowers only last one to two weeks and for the rest of the year, we must depend on other ornamental features such as fruit, leaves, fall color, or bark

and branching, which are visually appealing for much longer periods. Some shrubs have longer-lasting flowers such as shrub roses, butterfly bush, potentilla, Japanese spirea, and panicle hydrangea. Remember, flower displays can be cut short if there is a frost, drought, excessively warm temperatures, high winds, or heavy rains.

It is also a great idea to place plants with fragrant flowers near entranceways and windows. Some in this category include shrub roses, lilacs, magnolias, and the autumn blooming vine, sweet autumn clematis. Fragrance is related to temperature and humidity; high temperatures and humidity increase fragrance while cooler temperatures or rain affect it negatively.



LEONARD MESSEL MAGNOLIA

The primary consideration with flowers is: Are they large and showy or small, and best seen up close? Do they really make an impact in the landscape? Maybe individual flowers are not particularly showy but when many are produced or occur in clusters before the leaves emerge, the impact is significant. What color are the flowers? Most are white, pink, or mauve, with yellow and orange being uncommon flower colors in temperate woody plants. Plants with yellow flowers include forsythias, cornelian cherry dogwood, and Butterflies magnolia. Make sure the flower color does not clash with the building or house color or with another plant in bloom at the same time.

FLOWERING PLANTS

SCIENTIFIC NAME COMMON NAME

Fragrant

<i>Clematis terniflora</i>	Sweet autumn clematis
<i>Magnolia</i> spp.	Magnolias
<i>Rosa</i> spp.	Shrub roses
<i>Syringa</i> spp.	Lilacs
<i>Tilia</i> spp.	Lindens
<i>Viburnum carlesii</i>	Koreanspice viburnum

Long-lasting

<i>Buddleja davidii</i>	Butterfly bush
<i>Hamamelis virginiana</i>	Common witchhazel
<i>Hydrangea paniculata</i>	Panicle hydrangea
<i>Potentilla fruticosa</i>	Potentilla
<i>Rosa</i> spp.	Shrub roses
<i>Spiraea japonica</i>	Japanese spirea



UNIQUE PANICLE HYDRANGEA



FRUIT

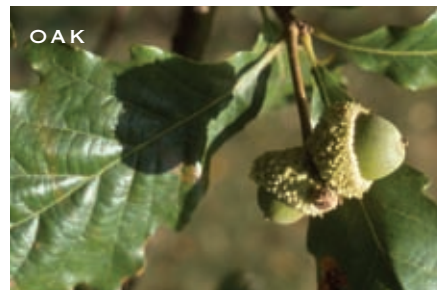
Fruit often last longer than flowers and are a particularly important ornamental consideration. Fruiting mostly occurs in late summer to autumn. The ornamental characteristics of fruit can be positive or negative and are influenced by numerous factors. Some fruits are quite unsightly and create a tremendous litter problem; for example, black walnut, female thornless honeylocust, and Hopa crabapple. Others, such as female ginkgo trees, have a very foul odor. The brightly colored fruit of some ornamental crabapples such as Red Jewel®, Harvest Gold®, and Firebird® are important for winter interest, but it is best to find varieties, such as the ones listed, with small, persistent fruit that won't make a mess on sidewalks. With many plants, the fruit is a positive ornamental feature and factors such as color, showiness, and attraction for wildlife should also be considered.

Many people enjoy watching wildlife that feeds on fruit. Plants with fleshy fruit that attract wildlife include crabapples, hawthorns, serviceberry, and most viburnums. Dry nut fruit can also attract birds and other mammals. Species that produce nut fruit are usually large trees such as oaks, beeches, and hickories. There are also a few shrubs that produce nut fruit such as hazelnuts. However, fruit sometimes attracts unwanted visitors, such as deer, that not only feed on the available fruit but on other plants as well—defoliating, damaging, or destroying them. For more information on deer-resistant plants, see the UW-Extension publication *Plants Not Favored by Deer* (A3727).

How visible are the fruit? Red is one of the best colors to draw attention because it attracts not only people but also birds looking for food. Other colors that occur in fruit are white, yellow, orange, blue, black, purple, pink, and bicolor. Are fruit borne singly or in clusters, which tend to be showier? Does the foliage hide the fruit? Does it drop early? Some shrubs have outstanding displays of fruit such as red and black chokeberries, some viburnums, winterberry, and the vine, American bittersweet.

The edibility of fruit is an important consideration when choosing plants for public areas. Poisonous plants, such as horsechestnuts and buckeyes, snowberry, burningbush, and the vine, American bittersweet, are not appropriate for playgrounds or places with children close by, while plants that produce edible fruit such as serviceberry, corneliancherry dogwood, and hazelnuts make wonderful additions to your yard.

A final consideration regarding fruit is the plant's pollination requirements. You may need pollination by another cultivar of the same species to get good fruit set, as is the case with viburnums. Or the plant may be dioecious, meaning it has separate male and female flowers located on two different plants. Dioecious plants require a male and female plant located close to each other to produce fruit. Examples include winterberry, and northern bayberry. You may not want to grow the female fruit of a particular dioecious species due to its smell or litter mess. Planting a male cultivar can overcome these problems. Ginkgo,



SELECTING FOR FRUIT

SCIENTIFIC NAME	COMMON NAME
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Showy

<i>Aronia</i> spp.	Chokeberries
<i>Celastrus scandens</i>	American bittersweet
<i>Ilex verticillata</i>	Winterberry
<i>Viburnum</i> spp.	Viburnums (some)

Attractive to wildlife

<i>Amelanchier</i> spp.	Serviceberries
<i>Carya</i> spp.	Hickories
<i>Corylus</i> spp.	Hazelnuts
<i>Crataegus</i> spp.	Hawthorns
<i>Fagus</i> spp.	Beeches
<i>Malus</i> spp.	Flowering crabapples
<i>Quercus</i> spp.	Oaks
<i>Viburnum</i> spp.	Viburnums (some)

Edible

<i>Amelanchier</i> spp.	Serviceberries
<i>Cornus mas</i>	Corneliancherry dogwood
<i>Corylus</i> spp.	Hazelnuts

Poisonous

<i>Aesculus</i> spp.	Horsechestnuts and buckeyes
<i>Celastrus scandens</i>	American bittersweet
<i>Euonymus alatus</i>	Burningbush
<i>Symphoricarpos albus</i>	Snowberry
<i>Taxus</i> spp.	Yews

thornless honeylocust, and Kentucky coffeetree female trees produce messy fruit, while the cultivars Autumn Gold, Skycole (Skyline®), and Espresso are fruitless, male cultivars of ginkgo, thornless honeylocust, and Kentucky coffeetree, respectively.

? IS THE FOLIAGE COLORFUL DURING THE GROWING SEASON OR IN AUTUMN?

FOLIAGE

The foliage of ornamental plants exhibits many characteristics to consider when making choices for a landscape. Most leaves are green, but there are different shades such as blue-green, or forest green. As leaves emerge, they may be a different color than the mature leaves. Some plants have purple leaves throughout the growing season and include Black Lace™ elderberry, Crimson King and Royal Red Norway maples, and Diabolo® and Summer Wine® eastern ninebark. A few species such

as Carol Mackie Daphne, variegated Tatarian dogwood, and Japanese dappled willow have variegated leaves; that is, leaves with two different colors such as white and green or yellow and green. Variegated leaves provide a nice splash of color and serve as a focal point in the landscape.

Don't forget evergreens—they are not just green. Some evergreens, such as Rainbow's End dwarf spruce, produce yellow new growth in spring before they turn green. Some evergreens stay yellow throughout the year, such as Golden Mop threadleaf falsecypress and Gold Coast® juniper. Others have blue needles all year, such as concolor or white fir, or blue spruce. Still others have a mixture of blue and green needles such as Swiss stone pine or Sander's Blue dwarf spruce.

What is the texture of the foliage? Coarse-textured, large foliage on trees allows little light to penetrate, which inhibits turf growth underneath. Fine-textured foliage (smaller or lacy leaves) on trees allows for filtered light shade. Thornless honeylocust, Kentucky coffeetree, and katsuratree provide filtered shade, allowing turfgrass to grow better than if grown under trees with dense shade. Foliage may also be glossy, dull, smooth, fuzzy, prickly, rough, wrinkled, or feathery. Contrast between the foliage and the flowers, fruit, bark, or stems is often one of a plant's best features.

Foliage, like some flowers, may be aromatic, especially when rubbed or pruned. Everyone is familiar with fragrant, culinary herbs, such as rosemary, basil, or thyme, but there are some woody plants with aromatic foliage such as Russian-sage, northern bayberry, arborvitae or eastern white-cedar or fir. You may only need to brush against these shrubs to notice their aroma, and they are particularly effective when planted near walkways, decks, or patios.



SUGAR MAPLE

What about fall color? Fall color is an important consideration given its spectacular contribution to the landscape. Some plants have poor or nonexistent fall color (yellowish-brown), while others are vibrant yellow, orange, red, or purple. Trees with outstanding fall color include Autumn Blaze® Freeman maple, sugar maple, ginkgo, and apple serviceberry. There are many different shrubs with excellent fall color including red chokeberry, fothergillas, and sumacs. Virginia creeper and Boston ivy are vines with spectacular fall color. For more information on plants with showy fall color, see UW-Extension publication *Selecting Woody Landscape Plants for Fall Color: An Illustrated Guide* (A3837).

PLANTS WITH INTERESTING FOLIAGE

SCIENTIFIC NAME COMMON NAME

Yellow to gold

Chamaecyparis pisifera Golden Mop threadleaf
'Golden Mop' falsecypress

Juniperus x pfitzeriana Gold Coast® juniper
'Aurea Improved'

Picea glauca Rainbow's End
'Rainbow's End' dwarf spruce

Thuja occidentalis Sunkist, Yellow Ribbon
'Sunkist,' 'Yellow Ribbon' arborvitae

Blue

Abies concolor Concolor, white fir

Picea glauca Sander's Blue
'Sander's Blue' dwarf spruce

Purple

Acer platanoides 'Crimson King,' 'Royal Red' Crimson King, Royal Red Norway maples

Physocarpus opulifolius Diabolo®, Summer Wine®
'Monlo,' 'Seward' eastern ninebark

Sambucus nigra 'Eva' Black Lace™ elderberry

Variegated

Cornus alba Variegated Tatarian
'Argenteo-marginata' dogwood

Daphne x burkwoodii Carol Mackie Daphne
'Carol Mackie'

Salix integra Japanese dappled
'Hakuro Nishiki' willow



SANDER'S BLUE DWARF SPRUCE



DOES THE PLANT HAVE INTERESTING BARK OR BRANCHES?

BARK AND BRANCHING

Many plants have interesting, ornamental bark. The textures and colors contribute considerable visual appeal and, in some plants, are the primary attraction. Deciduous plants are devoid of leaves for 5–6 months during the dormant season, so features such as the bark and branches are particularly important for creating winter interest. Trees with very showy bark include three-flowered maple, paper birch, and Amur chokecherry.

Branches can also be ornamental, offering varied colors and textures. Shrubs that have colorful twigs, especially in winter, include cultivars of red- and yellow-twig dogwoods, coral bark willow, and the vine, climbing hydrangea. Some plants' twig color is not colorful, but their unique winged or twisted branching provides interest in winter. Some plants in this category include burningbush or winged euonymus, Harry Lauder's walkingstick, and curly willow.

A few shrubs and trees have thorns, spines, or prickles that act as a barrier, preventing unwanted visitors from getting in or out of the landscape. Examples include Japanese barberry, shrub roses, flowering quince, and hawthorns. Use caution when planting these species near entranceways, patios, or decks where sharp projections may injure people as they pass by.



PLANTS WITH EXCELLENT FALL COLOR

SCIENTIFIC NAME	COMMON NAME
<i>Acer x freemanii</i> 'Jeffersred'	Autumn Blaze® Freeman maple
<i>Acer saccharum</i>	Sugar maple
<i>Amelanchier x grandiflora</i>	Apple serviceberry
<i>Aronia arbutifolia</i>	Red chokeberry
<i>Fothergilla</i> spp.	Fothergillas
<i>Ginkgo biloba</i>	Ginkgo
<i>Hamamelis virginiana</i>	Common witchhazel
<i>Nyssa sylvatica</i>	Black gum, tupelo
<i>Rhus</i> spp.	Sumacs

PLANTS WITH INTERESTING BARK OR BRANCHES

SCIENTIFIC NAME	COMMON NAME
Showy bark	
<i>Acer triflorum</i>	Three-flowered maple
<i>Betula papyrifera</i>	Paper birch
<i>Crataegus viridis</i> 'Winter King'	Winter King hawthorn
<i>Prunus maackii</i>	Amur chokecherry
Colorful twigs	
<i>Cornus stolonifera</i>	Redtwig and yellowtwig dogwoods
<i>Hydrangea petiolaris</i>	Climbing hydrangea (vine)
<i>Salix alba</i> 'Britzensis'	Coral bark willow
Unique branching pattern	
<i>Euonymus alatus</i>	Burningbush, winged euonymus
<i>Corylus avellana</i> 'Contorta'	Harry Lauder's walkingstick
<i>Salix matsudana</i> 'Tortuosa'	Curly willow

? WHAT CULTURAL REQUIREMENTS DOES IT NEED?

Cultural considerations

Soil, moisture, sunlight, wind, pest susceptibility, air pollution, deicing salt and urban tolerance, maintenance considerations, and black walnut toxicity are all critically important but often overlooked during plant selection. If cultural conditions are less than optimum for a particular species, it is best to select either another site or species better suited to that specific location. Matching your plant choices to their cultural requirements helps to ensure the plant has the best chance for healthy growth, development, and long-term survival.

SOIL

Soil adaptability factors to consider include texture, structure and compaction, pH and fertility, and temperature. Choose plants that are tolerant, especially to your soil texture and pH. A soil test taken before you choose your plants will determine your soil texture, pH, and fertility levels and help in making appropriate plant selections.

SOIL TEXTURE is the percentage of sand, silt, and clay in a soil. Soil texture is very difficult to change. Soil texture influences soil fertility, drainage, and aeration of soils. In general, a heavy clay soil has poor aeration and drainage, but can be high in fertility. Sandy soil typically has good aeration and drainage, but poor structure, fertility, and water retention. Loamy soil, which has a balanced blend of sand, silt, and clay, has good structure, fertility, aeration, drainage, and water retention. Unfortunately, this situation rarely occurs in urban and suburban soils.

Do not attempt to improve a heavy clay soil by adding sand; the result will be "cement." Instead, add organic material, such as sphagnum peat, leaf compost, pine bark, or other organic compost. Many plants tolerate some amount of clay in the soil, but there are few plant choices for dry, sandy soils. Some species that can adapt to these conditions are northern bayberry, common hackberry, shagbark hickory, creeping juniper, black oak, red pine, rugosa rose, and yucca.

SOIL STRUCTURE AND COMPACTION

is a great concern in landscape plantings, particularly in urban and suburban environments. Soil structure refers to the soil's ability to form aggregates (solid particles) of different sizes, both large and small. These aggregates form under natural conditions over long periods of time. Disturbing or manipulating the soil reduces or even destroys the soil's structure. Construction is a common cause of soil destruction when topsoil is removed and compacted, leaving high-clay subsoil behind. Compaction may also be caused by excessive foot and car traffic.



Loss of soil structure, caused by compaction, reduces water infiltration and drainage, decreases aeration levels required for root growth, and makes it more difficult for roots to penetrate the ground. Poor aeration and drainage in soils is evident where there is standing water, slow drainage, and a hard soil surface that resembles baked clay. Soil compaction is a major cause of tree decline, poor growth, and eventual plant death in urban and suburban areas.

In urban conditions, it is vitally important to choose plants that tolerate compacted soils, or to improve the soil structure. If the soil is heavily compacted and/or poorly drained (standing water for more than an hour following rainfall), consider improving drainage before planting by adding loose organic matter (peat moss, composted leaf mulch, pine bark, or compost) to raise the planting area. This helps roots become established in well-oxygenated soils.

Rototillers can be used to loosen up the soil prior to planting, but do not rototill soil directly under established trees; doing so will cut the roots into pieces and lead to tree decline. Do not apply topsoil or organic matter directly into the planting area, as this will create an interface between the poorly drained soil and the well-drained material you added, creating a "bathtub" effect where water stays in the hole and does not drain out into the existing soil. There are some plants that can tolerate heavily compacted soils such as common hackberry, hybrid elms, Kentucky coffeetree, and gray dogwood.

PLANTS FOR DRY, SANDY SOILS

SCIENTIFIC NAME COMMON NAME

<i>Carya ovata</i>	Shagbark hickory
<i>Celtis occidentalis</i>	Common hackberry
<i>Juniperus horizontalis</i>	Creeping juniper
<i>Juniperus virginiana</i>	Eastern red-cedar
<i>Morella</i> (formerly <i>Myrica</i>) <i>pennsylvanica</i>	Northern bayberry
<i>Pinus resinosa</i>	Red pine
<i>Quercus velutina</i>	Black oak
<i>Rosa rugosa</i>	Rugosa rose
<i>Yucca</i> spp.	Yuccas

SOIL PH AND FERTILITY are also important considerations when choosing landscape plants. The pH of a soil is based on a range of 0 (very acidic) to 14 (very alkaline) with a neutral pH of 7.0. Most woody plants prefer slightly acidic soil with a pH of 5.5–6.5. You can increase the pH by addition of lime, though this is rarely needed in urban or suburban areas in southern Wisconsin. You can lower the pH by adding elemental sulfur and organic matter, but this is a slow process, as natural bacteria will need to convert this insoluble sulphur to a form plants can use.

Nutrient availability is often directly related to soil pH. Species such as pin oak, red maple, river birch, and rugosa rose become very chlorotic in southeastern Wisconsin because the pH is too high (alkaline) and iron, or manganese in the case of red maple, is unavailable for root uptake. Chlorosis symptoms occur on leaves when the plants are grown at high pH and manifest themselves with yellowing leaves with the main veins in the leaf remaining dark green. Choose plants that are tolerant to high pH soils if your soil is alkaline. For more information on chlorosis and how to lower your soil pH, see the UW-Extension publication *Oak and Other Trees Disorder: Chlorosis* (A2638).

Some species, such as rhododendrons and azaleas, not only require a slightly acidic to acidic pH, but also fertile soils that are high in organic matter and nutrients. Soil fertility can be improved by adding organic matter such as compost or leaf mold, or by using slow or quick-release fertilizers. A good rule of thumb is that before you plant anything, make sure you get a soil test to determine pH and nutrient levels. You may already have sufficient phosphorus and potassium in your soil and addition of more will not be beneficial to plants.

SOIL TEMPERATURE influences root growth and the rate of chemical and biological processes. Temperature extremes can dry out and freeze roots. In paved or restricted rooting areas or areas surrounded by concrete or pavement (parking lots, sidewalk cutouts, and containers), soil temperatures may be colder in the winter and warmer in the summer than those in nearby lawn areas. Adding mulch to the top of the planting area will help cool soils in summer, insulate roots in winter, and retain moisture throughout the year. Apply mulch 2–4 inches deep and avoid mulch touching the trunk or branches. With regard to containers, they must have drainage and be large enough to accommodate the root system and insulated to help the plant survive cold winters. Roots die at significantly warmer temperatures than the tops of plants.

MOISTURE

Soil moisture conditions are strongly influenced by the previous factors of soil texture, structure, temperature, and others such as precipitation patterns and soil interfaces. Most woody plants need about 1 inch of water a week and will need supplemental irrigation when sufficient rainfall does not occur. Low soil moisture often occurs in sandy soils, during drought, where there are high soil surface temperatures, or when there is high deicing salt content in the soil. If your soil moisture characteristics are poor (too wet or too dry) and cannot be improved, be sure to choose plants that tolerate those conditions.

In general, plants like moist, well-drained soils, but some are drought-tolerant and a few tolerate wet soils. Some plants that are drought-tolerant (once established) include bur oak, junipers, cotoneasters, and gray dogwood. Willows, baldcypress, swamp white oak, and red- or yellow-twig dogwoods are some of the plants that tolerate wet soils. Many of the plants that tolerate wet soil also tolerate poorly drained, compacted soils.

PLANTS THAT TOLERATE MOISTURE EXTREMES

SCIENTIFIC NAME COMMON NAME

Tolerates dry soils (once established)

<i>Cornus racemosa</i>	Gray dogwood
<i>Cotoneaster</i> spp.	Cotoneasters
<i>Juniperus</i> spp.	Junipers
<i>Quercus macrocarpa</i>	Bur oak

Tolerates wet soils

<i>Cornus stolonifera</i>	Redtwig and yellowtwig dogwoods
<i>Quercus bicolor</i>	Swamp white oak
<i>Salix</i> spp.	Willows
<i>Taxodium distichum</i>	Baldcypress

Other considerations include how much rainfall the site typically receives. When are the dry months and do they occur during the growing season? If so, a lack of rainfall will significantly affect plant growth and development of leaves, flowers, and fruit. Excessive rain can flood areas, decreasing available soil oxygen—a requirement for all plants. During winter, snow and ice can weigh branches down and cause limbs to break. These are serious factors to consider when choosing landscape plants.

SUNLIGHT

Since plants require sunlight for growth, exposure to the sun is a basic environmental consideration when selecting plants. Most plants prefer full sun to light shade for proper growth and flowering while some tolerate dense shade and are often found as understory plants in woodlands. Plants requiring full sun conditions will need at least 6 hours of direct sunlight per day; partial shade tolerant plants require 2–5 hours of direct sunlight per day, particularly in the mornings, whereas shade-loving plants need less than 2 hours of direct sunlight each day, filtered sunlight, or no direct sun. Some plants that tolerate partial to full shade include Annabelle hydrangea, Carol Mackie daphne, witchhazels, yews, and eastern hemlock.

? IS THE PLANT SENSITIVE TO AIR POLLUTION OR DEICING SALTS?

Consider the duration and directness of sunlight. Do buildings or other trees shade the site? The type of shade in a landscape can change over time, becoming denser as trees and shrubs mature and fill in spaces. Light patterns can also change with the seasons and can affect growth patterns. An area that is in full sun in summer when the sun is high in the sky may have partial shade in spring and fall when the sun is at a lower angle. Visiting the site at different times of the day and season will help you determine the light patterns and choose a species appropriate to those conditions.

Avoid using structurally weak tree species like willows, poplars, and silver maple, that are prone to storm damage.

These species can cause significant damage during storms if planted near homes or other structures. Use trees that have strong wood and branch attachments with wide crotch angles (the angle distance between the branch and the main trunk of the tree) such as oaks and hickories. A planting area that is large enough will be needed to support a strong, extensive root system.

PEST SUSCEPTIBILITY

Whether or not a plant is pest-prone or pest-resistant is important. Some species, such as shrub roses, flowering crabapples, and hybrid elms, have disease-resistant varieties or cultivars that should be used instead of the disease-prone types. Much of the damage caused by insects and diseases is only cosmetic or non-life threatening. However, repeated defoliation or damage over the course of several years weakens a plant, making it more susceptible to severe attack by another pest or pathogen and may lead to the plant's death.

Both native and exotic species are susceptible to insects and diseases. Choose plants that are either resistant or not susceptible to various insects and/or pathogens. Avoid planting evergreens such as Colorado blue spruce, Austrian and Scots pines, and Rocky Mountain juniper, as they are all highly susceptible to insects and diseases.



ANNABELLE HYDRANGEA

SHADE-LOVING PLANTS

SCIENTIFIC NAME COMMON NAME

Daphne x burkwoodii Carol Mackie daphne
'Carol Mackie'

Hamamelis spp. Witchhazels

Hydrangea arborescens Annabelle hydrangea
'Annabelle'

Taxus spp. Yews

Tsuga canadensis Eastern hemlock

WIND

Constant winds increase a plant's need for water because of greater transpiration and evaporation. Buildings in urban areas can create a wind-tunnel effect and increase the wind speed in those locations. Sites exposed to strong western or southwestern winds should not only have adequate soil volume and moisture, but also contain plants suited to this environment that are not prone to winter burn injury. Excessive winter sun and wind can burn broad-leaved and narrow-leaved evergreens—in particular rhododendrons, yews, and eastern hemlock.

AIR POLLUTION

Air quality is an important factor for a sensitive plant's growth and survival. Plants are subject to site, size, and traffic patterns (for example, exhaust fumes) of urban areas and local industries, such as power plants. In addition, plants are affected by the area's climate, wind and weather patterns. Are large hills nearby? Areas directly east of hills or valleys between hills can lead to inversion layers and trapping of polluted air and smog levels that are dangerous not only to humans, but also to plants. Air pollution can damage plant tissues and reduce photosynthesis. Some species tolerate specific pollutants better than others.

A few plants sensitive to air pollution include sugar and red maples, mountainash, pagoda dogwood, American linden or basswood, eastern white pine, and Norway spruce. These plants typically perform better in rural or suburban communities with good air circulation, but they perform poorly in downtown, highly urbanized areas.



FIRE BLIGHT ON CRABAPPLE



SALT TOLERANCE

Tolerance to road deicing salt, especially to sodium chloride (NaCl), is very important for plants near streets or sidewalks that are heavily salted in winter. Salt damage may be incurred from aerial salt spray, which is common near roads with fast moving traffic. This salt is deposited on foliage and can cause significant damage to buds and leaves.

Salt may also accumulate in the soil as snow melts, especially near roads or sidewalks. Excessive soil salt can have a major effect on a plant's water and nutrient uptake. Some plants tolerant to deicing salts include Kentucky coffeetree, Japanese tree lilac, chokeberries, and sumacs. For more information on salt injury and plants tolerant to deicing salts, see the UW-Extension publication *Deicing Salt Injury in the Landscape and Salt-Tolerant Landscape Plants* (A3869).

URBAN TOLERANCE

Urban tolerance refers to a plant's tolerance to the cultural considerations discussed above. Plants that tolerate an urban environment have the ability to withstand harsh conditions such as extremes in temperature (both air and soil), extremes in moisture levels (both wet and dry), soil compaction, poor drainage and aeration, pH extremes, low fertility, deicing salts, air pollution, high winds from air tunnels created between buildings, and restricted areas to develop roots and shoots due to overhead and/or underground utilities. All these factors can significantly stress plants and increase their susceptibility to insects and diseases. Urban tolerance varies from plant to plant, but it can be enhanced with proper cultural practices, soil amendment, and species selection. Choose plants that are known to tolerate urban conditions if you live in a highly urbanized area. Some native species are appropriate for these extremes, while others are not. Urban soils are anything but native.

MAINTENANCE CONSIDERATIONS

Trees and shrubs require proper maintenance and pruning, especially in the first 5–10 years. This will allow proper height, spacing, and clearance of larger branches that grow over sidewalks or streets. You will need to water often (especially during hot, dry weather) until the plant is established which may take up to 3 years. In general, slower growing trees and shrubs require less pruning and tend to live longer with fewer structural problems.

Be sure to consider the longevity of plants you may select. Some popular plants, such as white-barked birches, purpleleaf sandcherry, Newport plum, and Colorado blue spruce, are short-lived in the urban landscape. You may choose to plant a particular tree or shrub, but if it is pest- and disease-prone, it may die in a few years from infestation or infection. Some municipalities may prohibit planting of certain plant species that are known to be a litter nuisance, hazard to people, encourage insects, or harbor diseases. Check with your city or municipality for information. Proper site and plant selection can reduce costs due to maintenance, removal, infrastructure damage, and liability.

BLACK WALNUT TOXICITY

Black walnut and butternut trees and, to a much lesser extent hickories, produce a toxin called juglone in all parts of the tree, but especially in the buds, nut hulls, and roots. This toxin prevents many other plants from growing under or near these trees. Plants susceptible to juglone will be stunted and can wilt and/or die. These include tomatoes, potatoes, eggplant, peppers, and ornamentals such as lilacs, rhododendrons and azaleas, flowering crabapples, and peonies. The toxic effects of a mature black walnut tree can extend far away from the tree trunk, with the greatest toxicity occurring within the tree's drip line.

If you must plant in the vicinity of a black walnut, it is essential to choose plants that are resistant. Even after a black walnut tree is removed, juglone will not be eliminated because the toxin is in the tree's roots. It will take many years for the roots to decay and toxin levels to diminish. Do not use wood chips or bark pieces from a walnut tree as mulch. For more information on black walnut toxicity and plants tolerant or susceptible to juglone see *Black Walnut Toxicity* (XHT1017, www.uwex.edu/ces/wihort/GardenFacts.html).



ARE THERE ANY REGULATIONS OR LOCAL ORDINANCES PREVENTING ME FROM PLANTING?





**WHAT EXISTING VEGETATION EXISTS IN THE AREA?
ARE THERE ANY INVASIVE PLANTS?**

Native habitat and invasiveness

NATIVE OR EXOTIC

A selection factor that you may wish to consider is the native origin of a potential plant choice. Is a particular species native to your area? Planting exclusively native species in the landscape can be beautiful in a home garden, but in harsh urban conditions, many native plants perish due to poor soils, drainage problems, deicing salts, drought, and heat. Many exotic species can be used in most residential landscapes, and very few of them are truly invasive. Some are considerably more tolerant to urban conditions compared to native plants.

INVASIVENESS

Exotic species have brought with them the issue of ecological invasiveness. How invasive in the wild is this species? Avoid exotic species that are very invasive such as autumn-olive, black locust, buckthorns (common and tallhedge glossy), honeysuckles (Amur, Bell's, Morrow's, Tatarian, Freedom, and Honeyrose), multiflora rose, Oriental bittersweet, Russian-olive, Siberian elm, and white mulberry. These plants can take over forested areas, replacing native species and causing ecological damage. Even some native species could be considered aggressive because they reseed readily and/or spread quickly, such as boxelder and gray dogwood, the latter if it is growing in prairies.

Avoid planting potentially invasive species such as Amur maple, burningbush, English ivy, European cranberrybush viburnum, Japanese barberry, Norway maple, vinca, and wintercreeper euonymus near natural or wooded areas. These species can readily spread in the wild through reseeding and/or suckering growth.



TALLHEDGE GLOSSY BUCKTHORN (INVASIVE)



NATIVE PAPER BIRCH



INVASIVE BUCKTHORN IN FOREST UNDERSTORY



Selecting high-quality nursery stock

When selecting nursery plants, make sure you pay particular attention to the factors below. Avoid buying stock that looks questionable, even though it may be cheap. By properly selecting quality nursery stock in the beginning, you will have a head start on establishing a healthy landscape. Buy landscape plants from a nursery or garden center with a good reputation and people you trust. Chances are that an experienced, reputable nursery or garden center will have grown and maintained the plants properly and the plants will reliably establish in your garden if they are planted and maintained correctly.

FOLIAGE

A healthy, well-balanced crown should be visible. Foliage should be free of insects and diseases and turgid (not wilting). The leaves should be a healthy green color unless you are working with a yellow, blue, purple, or variegated-leaf cultivar. Avoid plants with scorched or brown leaf margins; this indicates water stress.

TRUNK, BARK, AND BRANCHES

For trees, a straight, single, central leader is preferred, unless the plant is normally sold as a multi-stem or clump form tree. The trunk should be free of insect holes, damage, cracks, and sunken or swollen areas. It should have good taper and flare appropriately at the base. The branches should be evenly distributed in the crown preferably with a wide angle of attachment between the trunk and the branch. The branches should show good vigor and growth. Avoid buying trees with lots of suckers (shoots) at the base or watersprouts in the crown (shoots that do not bear flowers or fruit and are growing straight up and not outward). Underneath, the top layer of bark on the branches should be green. Brittle branches that break off easily are a sign of a dead or dying tree or shrub.



ROOTS

Roots are the most important part of a plant, but they are often overlooked. Examine the root system, if possible, on a container-grown plant before you purchase it. Plants should be well-rooted and firmly established in the container. Healthy, white, fibrous roots with evenly distributed lateral roots should be apparent. Avoid buying trees or shrubs with circling or matted roots. Circling roots in a container will need to be cut or stretched out before planting in the soil to prevent future girdling roots (roots that encircle the trunk and kill the plant).

If buying a balled and burlapped tree, make sure the trunk is centered in the root ball and firmly attached without a loose or damaged root ball. All plants should have a root ball that is adequate for the size of the crown or caliper of the trunk as specified by the American Standard for Nursery Stock. A reputable nursery will have this information. The root ball should be moist at time of purchase and not dry. Avoid plants with weedy root balls, as you will have to remove the weeds before planting to avoid introducing them into your yard. Balled and burlapped root balls should be covered with natural burlap, not synthetic.

If purchasing bare-root stock, make sure the roots have been kept moist with packing material or burlap, are adequately spaced around the plant, and have no circling or kinked roots.

References

Dirr, M.A. 1997. *Dirr's Hardy Trees and Shrubs: An Illustrated Encyclopedia*. Timber Press, Portland, OR.

Rose, N., D. Selinger, and J. Whitman. 2001. *Growing Shrubs and Small Trees in Cold Climates*, Contemporary Books, Lincolnwood, IL.

For more information

To learn more about gardening in Wisconsin based on the latest university research, visit the web sites of the UW–Madison Horticulture Team (www.uwex.edu/ces/wihort/) and UW–Extension Publications (learningstore.uwex.edu).

The following publications are available from UW–Extension Publications:

Guide to Selecting Landscape Plants for Wisconsin (A2865). Describes the mature height, shape, and preferred growing conditions for hundreds of trees, shrubs, and vines.

Plants Not Favored by Deer (A3727). A lengthy list of plants deer tend to avoid.

Selecting Woody Landscape Plants for Fall Color: An Illustrated Guide (A3837). Brighten your autumn by including plants with stunning fall color in your landscape.

Deicing Salt Injury in the Landscape and Salt-Tolerant Landscape Plants (A3869). Identify and prevent salt injury. Includes an extensive list of salt-tolerant plants.

SCIENTIFIC NAMES OF PLANTS

Arborvitae	<i>Thuja occidentalis</i>
Arborvitae 'Sunkist'	<i>Thuja occidentalis</i> 'Sunkist'
Arborvitae 'Yellow Ribbon'	<i>Thuja occidentalis</i> 'Yellow Ribbon'
Autumn-olive	<i>Elaeagnus umbellata</i>
Azaleas	<i>Rhododendron</i> spp.
Baldcypress	<i>Taxodium distichum</i>
Barberry, Japanese	<i>Berberis thunbergii</i>
Barberry, Japanese, Crimson Pygmy	<i>Berberis thunbergii</i> 'Crimson Pygmy'
Basswood	<i>Tilia americana</i>
Bayberry, Northern	<i>Morella</i> (formerly <i>Myrica</i>) <i>pennsylvanica</i>
Beech, American	<i>Fagus grandifolia</i>
Beech, Purple-leaf	<i>Fagus sylvatica</i> f. <i>purpurea</i>
Birch, Paper	<i>Betula papyrifera</i>
Birch, River	<i>Betula nigra</i>
Birches, White-barked	<i>Betula papyrifera</i> , <i>B. populifolia</i> , <i>B. pendula</i>
Bittersweet, American	<i>Celastrus scandens</i>
Bittersweet, Oriental	<i>Celastrus orbiculatus</i>
Black Gum	<i>Nyssa sylvatica</i>
Boxelder	<i>Acer negundo</i>
Boxwoods	<i>Buxus</i> spp.
Buckeyes	<i>Aesculus</i> spp.
Buckthorn, Common	<i>Rhamnus catharticus</i>
Buckthorn, Tallhedge Glossy	<i>Rhamnus frangula</i> 'Columnaris'
Burningbush	<i>Euonymus alatus</i>
Butterfly Bush	<i>Buddleja davidii</i>
Butternut	<i>Juglans cinerea</i>
Chokeberry, Black	<i>Aronia melanocarpa</i>
Chokeberry, Red	<i>Aronia arbutifolia</i>
Chokecherry, Amur	<i>Prunus maackii</i>
Clematis, Sweet Autumn	<i>Clematis terniflora</i>
Clethra, Summersweet	<i>Clethra alnifolia</i>
Coffeetree, Kentucky	<i>Gymnocladus dioica</i>
Cotoneasters	<i>Cotoneaster</i> spp.
Crabapples, Flowering	<i>Malus</i> spp.
Crabapple, Cinderella®	<i>Malus</i> 'Cinzam'
Crabapple, Firebird®	<i>Malus sargentii</i> 'Select A'
Crabapple, Harvest Gold®	<i>Malus</i> 'Hargozam'
Crabapple, Hopa	<i>Malus</i> 'Hopa'
Crabapple, Red Jewel®	<i>Malus</i> 'Jewelcole'
Crabapple, Tina	<i>Malus sargentii</i> 'Tina'
Creeper, Virginia	<i>Parthenocissus quinquefolia</i>
Currant, Alpine	<i>Ribes alpinum</i>
Daphne, Carol Mackie	<i>Daphne x burkwoodii</i> 'Carol Mackie'
Dogwood, Corneliancherry	<i>Cornus mas</i>
Dogwood, Flowering	<i>Cornus florida</i>
Dogwood, Gray	<i>Cornus racemosa</i>
Dogwood, Pagoda	<i>Cornus alternifolia</i>
Dogwood, Redtwig and Yellowtwig	<i>Cornus stolonifera</i>
Dogwood, Variegated Tatarian	<i>Cornus alba</i> 'Argenteo-marginata'
Douglas-fir	<i>Pseudotsuga menziesii</i> var. <i>glauca</i>
Elderberry, Black Lace™	<i>Sambucus nigra</i> 'Eva'
Elm, Siberian	<i>Ulmus pumila</i>
Euonymus, Winged	<i>Euonymus alatus</i>
Euonymus, Wintercreeper	<i>Euonymus fortunei</i>
Falsecypress, Threadleaf, Golden Mop	<i>Chamaecyparis pisifera</i> 'Golden Mop'

Fir, Concolor or White	.....	<i>Abies concolor</i>
Forsythia, Border	.....	<i>Forsythia x intermedia</i>
Forsythia, Sunrise	.....	<i>Forsythia</i> 'Sunrise'
Fothergillas	.....	<i>Fothergilla</i> spp.
Ginkgo	.....	<i>Ginkgo biloba</i>
Hackberry, Common	.....	<i>Celtis occidentalis</i>
Hawthorn, Winter King	.....	<i>Crataegus viridis</i> 'Winter King'
Hazelnuts	.....	<i>Corylus</i> spp.
Hemlock, Eastern or Canadian	.....	<i>Tsuga canadensis</i>
Hickory, Shagbark	.....	<i>Carya ovata</i>
Honeylocust, Thornless, Skyline®	.....	<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'Skycole'
Honeysuckle, Amur	.....	<i>Lonicera maackii</i>
Honeysuckle, Bell's	.....	<i>Lonicera x bella</i>
Honeysuckle, Freedom	.....	<i>Lonicera</i> 'Freedom'
Honeysuckle, Honeyrose	.....	<i>Lonicera</i> 'Honeyrose'
Honeysuckle, Morrow's	.....	<i>Lonicera morrowii</i>
Honeysuckle, Tatarian	.....	<i>Lonicera tatarica</i>
Hornbeam, American	.....	<i>Carpinus caroliniana</i>
Horsechestnuts	.....	<i>Aesculus</i> spp.
Hydrangea, Annabelle	.....	<i>Hydrangea arborescens</i> 'Annabelle'
Hydrangea, Climbing	.....	<i>Hydrangea petiolaris</i>
Hydrangea, Panicle, Unique	.....	<i>Hydrangea paniculata</i> 'Unique'
Ivy, Boston	.....	<i>Parthenocissus tricuspidata</i>
Ivy, English	.....	<i>Hedera helix</i>
Juniper, Creeping	.....	<i>Juniperus horizontalis</i>
Juniper, Gold Coast®	.....	<i>Juniperus x pfitzeriana</i> 'Aurea Improved'
Juniper, Rocky Mountain	.....	<i>Juniperus scopulorum</i>
Juniper, Saybrook Gold	.....	<i>Juniperus x pfitzeriana</i> 'Saybrook Gold'
Katsuratree	.....	<i>Cercidiphyllum japonicum</i>
Lilac, Japanese Tree	.....	<i>Syringa reticulata</i>
Linden, American	.....	<i>Tilia americana</i>
Locust, Black	.....	<i>Robinia pseudoacacia</i>
Magnolia, Butterflies	.....	<i>Magnolia</i> 'Butterflies'
Magnolia, Leonard Messel	.....	<i>Magnolia x loebneri</i> 'Leonard Messel'
Maple, Amur	.....	<i>Acer tataricum</i> subsp. <i>ginnala</i>
Maple, Freeman, Autumn Blaze®	.....	<i>Acer x freemanii</i> 'Jeffersred'
Maple, Miyabe, State Street®	.....	<i>Acer miyabei</i> 'Morton'
Maple, Norway	.....	<i>Acer platanoides</i>
Maple, Norway, Crimson King	.....	<i>Acer platanoides</i> 'Crimson King'
Maple, Norway, Royal Red	.....	<i>Acer platanoides</i> 'Royal Red'
Maple, Red	.....	<i>Acer rubrum</i>
Maple, Silver	.....	<i>Acer saccharinum</i>
Maple, Sugar	.....	<i>Acer saccharum</i>
Maple, Three-flowered	.....	<i>Acer triflorum</i>
Mountainash	.....	<i>Sorbus</i> spp.
Mulberry, White	.....	<i>Morus alba</i>
Musclewood	.....	<i>Carpinus caroliniana</i>
Ninebark, Eastern, Diabolo®	.....	<i>Physocarpus opulifolius</i> 'Monlo'
Ninebark, Eastern, Summer Wine®	.....	<i>Physocarpus opulifolius</i> 'Seward'
Oak, Black	.....	<i>Quercus velutina</i>
Oak, Bur	.....	<i>Quercus macrocarpa</i>
Oak, Chinkapin	.....	<i>Quercus muehlenbergii</i>
Oak, Pin	.....	<i>Quercus palustris</i>
Oak, Swamp White	.....	<i>Quercus bicolor</i>
Pachysandra, Japanese	.....	<i>Pachysandra terminalis</i>
Pawpaw	.....	<i>Asimina triloba</i>
Peonies	.....	<i>Paeonia</i> spp.



Pine, Austrian	.....	<i>Pinus nigra</i>
Pine, Eastern White	.....	<i>Pinus strobus</i>
Pine, Ponderosa	.....	<i>Pinus ponderosa</i>
Pine, Red	.....	<i>Pinus resinosa</i>
Pine, Scots	.....	<i>Pinus sylvestris</i>
Pine, Swiss Stone	.....	<i>Pinus cembra</i>
Phlox, Creeping	.....	<i>Phlox subulata</i>
Plum, Newport	.....	<i>Prunus</i> 'Newport'
Poplars	.....	<i>Populus</i> spp.
Potentilla	.....	<i>Potentilla fruticosa</i>
Quince, Flowering	.....	<i>Chaenomeles speciosa</i>
Red-cedar, Eastern	.....	<i>Juniperus virginiana</i>
Redbud, Eastern	.....	<i>Cercis canadensis</i>
Rhododendrons	.....	<i>Rhododendron</i> spp.
Rose, Multiflora	.....	<i>Rosa multiflora</i>
Rose, Rugosa	.....	<i>Rosa rugosa</i>
Rose, Shrub	.....	<i>Rosa</i> spp.
Russian-olive	.....	<i>Elaeagnus angustifolia</i>
Russian-sage	.....	<i>Perovskia atriplicifolia</i>
Sandcherry, Purpleleaf	.....	<i>Prunus x cistena</i>
Sassafras	.....	<i>Sassafras albidum</i>
Serviceberry, Apple	.....	<i>Amelanchier x grandiflora</i>
Snowberry	.....	<i>Symphoricarpos albus</i>
Spirea, Japanese	.....	<i>Spiraea japonica</i>
Spruce, Colorado Blue	.....	<i>Picea pungens</i> var. <i>glauca</i>
Spruce, Norway	.....	<i>Picea abies</i>
Spruce, Rainbow's End Dwarf	.....	<i>Picea glauca</i> 'Rainbow's End'
Spruce, Sander's Blue Dwarf	.....	<i>Picea glauca</i> 'Sander's Blue'
Sumacs	.....	<i>Rhus</i> spp.
Tuliptree or Tulip-poplar	.....	<i>Liriodendron tulipifera</i>
Tupelo	.....	<i>Nyssa sylvatica</i>
Viburnum, American Cranberrybush,	.....	<i>Viburnum trilobum</i> Compact 'Compactum'
Viburnum, European Cranberrybush	.....	<i>Viburnum opulus</i>
Viburnum, Koreanspice	.....	<i>Viburnum carlesii</i>
Vinca	.....	<i>Vinca minor</i>
Walkingstick, Harry Lauder's	.....	<i>Corylus avellana</i> 'Contorta'
Walnut, Black	.....	<i>Juglans nigra</i>
White-cedar, Eastern or Northern	.....	<i>Thuja occidentalis</i>
Willow, Coral Bark	.....	<i>Salix alba</i> 'Britzensis'
Willow, Curl	.....	<i>Salix matsudana</i> 'Tortuosa'
Willow, Japanese Dappled	.....	<i>Salix integra</i> 'Hakuro Nishiki'
Winterberry	.....	<i>Ilex verticillata</i>
Wisteria, Kentucky	.....	<i>Wisteria macrostachys</i>
Witchhazel, Common	<i>Hamamelis virginiana</i>
Woodruff, Sweet	<i>Galium odoratum</i>
Yews	<i>Taxus</i> spp.
Yuccas	<i>Yucca</i> spp.

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Choosing the Right Landscape Plants: Factors to Consider (A3864)

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