



**A Cooperative Guide**  
**Growing Trees and Vegetation**  
**Within**  
**Electrical Transmission Line Corridors**

*A Cooperative Effort Between*

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**University of Wisconsin – Stevens Point**

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**And**

**Dairyland Power Cooperative**



**College**  
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## PROJECT CREDITS

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Figure 3 (Reprinted with permission of the Edison Electric Institute)

The authors gratefully thank Dennis Fallon (Excel Energy), Brian Asmus (Minnesota Power), and Byron Johnson (Great River Energy) and Dairyland Power Cooperative for their constructive reviews and comments with this publication.

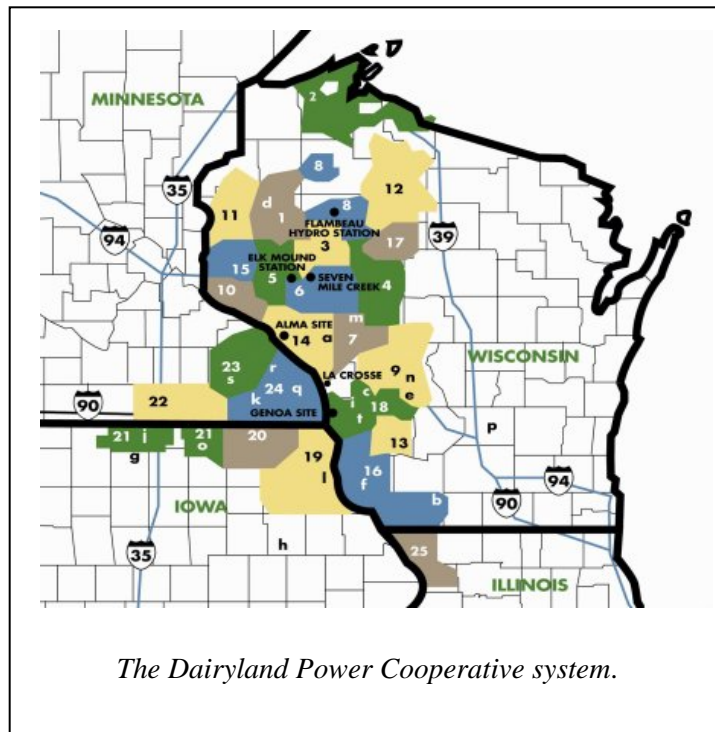


**D**airyland Power Cooperative has developed a long history of providing safe, reliable and economical electrical energy to its member cooperatives from its beginning in 1941. Today, Dairyland supplies the total wholesale electrical energy requirements for its member rural electric cooperatives, as well as a number of municipalities, within a service territory that includes 62 counties throughout Illinois, Iowa, Minnesota and Wisconsin. Dairyland generates more than 1,000 megawatts of electrical capacity by way of coal and gas-fired generating stations, a hydroelectric generating station, landfill gas to energy generating stations, agricultural-based manure digester generating units, and wind generation. The electrical energy is delivered to the member rural electric cooperatives through some 3100 miles of overhead electrical transmission lines that serve over 330 electrical distribution substations. Dairyland's member rural electric cooperatives deliver the electricity to over 575,000 people at their homes, farms and businesses.

Dairyland strives to deliver safe, reliable and competitively priced electrical energy and services to its members through the wise use and application of resources. Dairyland makes every effort to improve the quality of life within its service

territory by conducting its business as a responsible member of the community, acting as good stewards of the environment, and following sound safety practices.

The reliable delivery of electricity from the generating station to Dairyland's member rural electric cooperatives and municipalities is wholly dependent upon the safe and uninterrupted operation of electrical transmission line systems. Trees, shrubs, and brush that come into contact with electrical transmission lines can create hazards that jeopardize the delivery of electricity, and more importantly, pose a significant risk of injury to people and property.



*The Dairyland Power Cooperative system.*

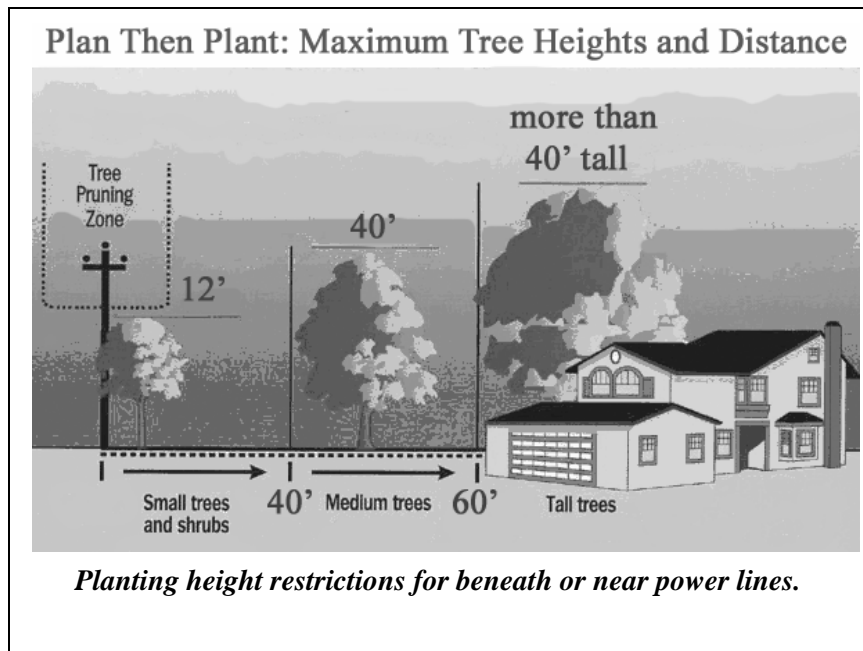
*A Cooperative Guide - Growing Trees and Vegetation Within Electrical Transmission Line Corridors*

**YOU PLAY AN IMPORTANT ROLE** in the safe, reliable and economical delivery of electricity. Trees, shrubs and plants that grow to a mature height of more than 12 feet are simply not compatible with the safe and reliable operation of an electrical transmission line. Any tree or shrub that is planted within or adjacent to the line right of way is at risk of damage and likely removal whenever Dairyland performs routine or emergency line maintenance work. Your investment in trees and landscaping can be very costly and damage done to trees and shrubs as a result of Dairyland field operations can be avoided by planting in the right location. This publication describes many trees and bushes that can be planted beneath or adjacent to line corridor and do not jeopardize electrical transmission line operation.



**L**andscaping adds beauty and function to property. Seasonal colors, form and shape are the most common considerations we make when choosing landscape trees, shrubs and plants. Soil conditions are important when choosing trees, shrubs and plants in order to provide an adequate and compatible environment for successful tree, shrub and plant growth. Mature heights of all vegetation must be considered when selecting trees, shrubs and plants that will meet your aesthetic needs while also avoiding height conflicts with overhead electric lines. The choice of a tree, shrub or plant that will mature at a height that is in compliance with clearance limitations under an electrical transmission line is essential (Figure 2).

The distance away from the centerline of an electrical transmission line generally determines the



maximum mature height of a tree, shrub or plant that may be planted and maintained within an electric line easement corridor. Dairyland Power Cooperative, in general, is authorized to maintain an 80 foot wide line right of way corridor (measured 40 feet on each side of the centerline of the electrical

transmission line) that is kept **free and clear** of all trees, shrubs and other tall plants and vegetation that may endanger or interfere with the safe and reliable operation of the electrical transmission line system. Dairyland also **removes** tall and leaning trees that are located adjacent to and outside of the 80 foot wide right of way strip that may endanger the electrical transmission line facility when falling. This type of right of way corridor “vegetation clearing” also includes the removal of tall and leaning trees that may grow to heights that endanger the electrical transmission line facility during a 5 year growth horizon or into the next scheduled vegetation maintenance cycle.

**DAIRYLAND DOES NOT TRIM TREES** because of the obvious safety considerations, electrical system reliability demands, electrical flashover potential and the eventual tree damage or loss caused by repeated trimming. Trees and tall vegetation will be removed from the line right of way corridor, without compensation, under the authority of Dairyland's existing Right of Way Easement For Rural Electric Line.

Dairyland acknowledges that it is preferable that all electrical transmission line corridors be maintained in a near pastoral setting, free and clear of all vegetative obstacles in order to provide the most safe, reliable, and economical method of line facility and right of way vegetation management. Dairyland also recognizes that many landowners prefer to maintain a more wooded, or semi-wooded landscape that may, at times, include the re-introduction of trees and shrubs into the electrical transmission line right of way corridor. Those plantings are often done in violation of Dairyland's lawful easement rights.

**Tree, shrub and plant heights cannot exceed 12 feet in height at maturity when placed beneath an electrical transmission line and within the 80 foot wide easement corridor and cannot be located in such a way that inhibits Dairyland's vehicular access to the electrical transmission line facilities.** Trees, shrubs and plants that are planted 40 to 60 feet away from the center wire of the electrical transmission line may grow to a mature height of no more than 40 feet. Trees, shrubs and plants that are located beyond 60 feet from the center wire of the electrical transmission line may grow to heights greater than 40 feet, but are still at risk of removal if the fall line of the vegetation endangers the line facility. A number of trees, unfortunately, are simply not compatible with the limitations of an electrical transmission line corridor and can not be introduced into the right of way for safety and code clearance reasons. A partial list of those species is shown at the end of this publication.

This booklet provides the descriptions and photos of trees, bushes and plants that are quite compatible with electrical transmission line corridors.

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## **PLANTS COMPATIBLE WITHIN TRANSMISSION LINE CORRIDORS**

The plants listed below will either mature at heights below 12 feet or will require minimal pruning to maintain a height below 12 feet.



### **Red buckeye (*Aesculus pavia*)**

10-15 feet tall by 10-15 feet wide.

The deep red flowers of the red buckeye mark the coming of spring and the passing of another cold, gray winter. An early bloomer, the red buckeye often attracts hummingbirds while in flower. Mature red buckeye produce nuts that are consumed by many wild animals. Uneaten nuts may become a nuisance, especially with trees planted near walkways and sidewalks.



### **Fox Valley river birch (*Betula nigra* ‘Little King’ and Tecumseh Compact™)**

10 feet tall by 12 feet wide.

Two dwarf cultivars of river birch that grow to 10 to 12 feet tall. They exhibit the same gorgeous peeling bark as their larger counterpart. This tree is often seen as a multi-trunk specimen, a style that is quite befitting of river birches. Care must be taken to ensure these plants are well watered during establishment and during dry summer months.



### **Fringetree (*Chionanthus virginicus*)**

10-15 feet tall by 10-15 feet wide.

This native plant may be found in both shrub and tree form. In May, fragrant white flowers are found in clumps or panicles throughout the tree. Bright blue fruit persist in fall, adding an additional source of seasonal interest.

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## **PLANTS COMPATIBLE WITHIN TRANSMISSION LINE CORRIDORS**

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### **Burning bush** (*Euonymus alata*)

10-15 feet tall by 10-15 feet wide.

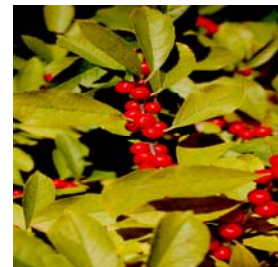
Often found as a multi-stemmed shrub, some varieties of burning bush take on a tree form. An intense red fall color gives this species its dramatic common name. Corky “wings” found on branches and twigs catch snow in winter giving the plant another source of seasonal interest. Burning bush does have the potential to become an invasive plant.



### **Winterberry** (*Ilex verticillata*)

8-10 feet tall by 5-10 feet wide.

As its name suggests, the red berries of this native tree persist throughout winter. Small white flowers which bloom each spring provide an additional season of interest. Leaves turn black in fall after the first frost. You need both a male and female plants for fruiting with the cultivars ‘Raritan’ and ‘Jim Dandy’ making great male pollinators.



*Winterberry Fruits*



### **Crab apple** (*Malus* spp.)

Variable height and widths.

Hundreds of crab apple cultivars have been documented and more are developed each year. Many are selected for their spring flowers or resistance to disease. Common diseases include fireblight, cedar apple rust, and apple scab. Disease resistant cultivars are advised over non-resistant trees.



## **PLANTS COMPATIBLE WITHIN TRANSMISSION LINE CORRIDORS**

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### **Crab apple (*Malus* spp.) – Continued.**

Fruit adds additional seasonal interest but may be a nuisance especially near sidewalks. Example small stature cultivars are listed below.

- ‘Camzon’ 10 feet tall by 8 feet wide
- ‘Lanzam’ 8-10 feet tall by 8 feet wide
- ‘Lollizam’ 8-10 feet tall by 8 feet wide
- ‘Mary Potter’ 10-12 feet tall by 15-20 feet wide
- ‘Red Jade’ 10-12 feet tall by 15-20 feet wide
- ‘Sargent’ 6-8 feet tall by 6-8 feet wide



### **Dwarf Alberta spruce (*Picea glauca* ‘Conica’)**

5-10 feet tall by 5-10 feet wide.

The dwarf Alberta spruce is a natural occurring dwarf cultivar with dense, bright green foliage. Its needles are extremely fine, giving the tree a soft, attractive look. It makes an excellent specimen plant. Care must be taken to ensure young plants are properly watered both in the dry summer months to prevent desiccation and in fall to prevent winter damage.



### **Dwarf Serbian spruce (*Picea omorika* ‘Nana’ and ‘Pimoko’)**

5-10 feet tall by 5-10 foot wide.

These slow-growing Serbian spruce varieties exhibit globular or “ball” shape forms. Everyone needs a ball in their yard. The needles on this spruce display an interesting mix of bluish grey and green. Also try ‘Pendula Brunns’ as a dwarf weeping form.

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**Hoptree (*Ptelea trifoliata*)**

10-15 feet tall by 10-15 feet wide.

Often grows naturally as a shrub form, the hoptree can easily be trained as a small tree. A native plant, it is considered threatened or endangered in parts of its northern range. Its fruit is a wafer shaped papery samara (winged seed) which gives the tree another common name, waferash.



*Flowers*



**Staghorn or Smooth Sumac (*Rhus typhina*, *Rhus glabra*)**

10-15 feet tall by 10-15 feet wide

Staghorn sumac is often seen as a clump of small trees or a large loosely packed shrub. Large compound leaves measure over a foot long give the tree and umbrella-like appearance. Intriguing crimson fruit persist much of the year.



*Sumac Fruits*



**American bladdernut (*Staphylea trifolia*)**

10-15 feet tall by 10-15 feet wide

The American bladdernut produces bell-shaped flowers each spring that develop into a hollow, air-filled seed pod. Often found as a shrub, this plant may be trained as a tree. If a tree form is desired, emerging suckers will need to be routinely removed. American bladdernut prefers rich, moist soils.





**PLANTS THAT MAY BE PLANTED 40 TO 60 FEET FROM THE TRANSMISSION LINE CENTER WIRE**

These trees, shrubs and plants are not suitable for planting directly beneath the electrical transmission line or within the 80 foot wide easement corridor. You may place these trees, shrubs and plants, however, at least 40 to 60 feet away from the center wire of the electrical transmission line.



**Amur maple** (*Acer ginnala*)

15-20 feet tall by 20-25 feet wide.

This small multi-stemmed maple is often used as a windbreak or in roadside plantings. Still, its brilliant scarlet fall color makes this attractive tree an excellent specimen plant. Amur maple is a prolific seeder and may have some invasive tendencies. Although extremely cold hardy and adaptable, Amur maple does not tolerate alkaline soils or salinity.



**Striped maple** (*Acer pensylvanicum*)

15-20 feet tall by 15-20 feet wide

Native to New England and the Appalachian region of the United States, striped maple is named for the vertical white stripes found along its trunk. In spring, strings of yellow, bell shaped flowers hang from the crown. Striped maple is usually found in the forest understory and does not do well in full sunlight.



**Three-flowered maple** (*Acer triflorum*)

20-25 feet tall by 15-20 feet wide.

This maple is truly a year-round specimen tree. In spring the three-flowered maple produces clusters of three yellow flowers. As the flowers fade, winged samara from and persist into summer. Fall colors range from orange to yellow each year. Finally, the tree's peeling bark give the three-flowered maple year-round interest.

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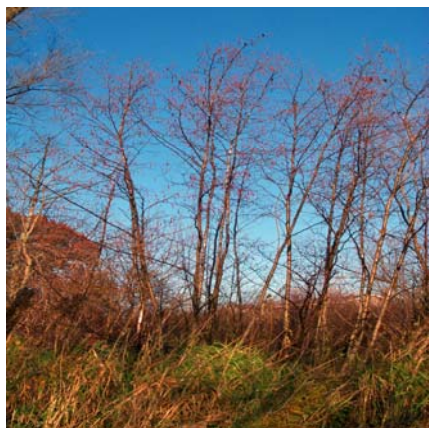
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**Shantung maple (*Acer truncatum*)**

20-25 feet tall by 15-20 feet wide.

Originally from Northern China, the Shantung maple has been emerging as a specimen tree throughout much of the United States. This maple features unique star-shaped leaves and brilliant red fall color. Like other trees with expansive native ranges, it is important to purchase plants from a seed source that matches your climate.



**Speckled alder (*Alnus incana*)**

15-25 feet tall by 15-25 feet wide

This native plant is commonly found in wetlands and riparian areas. Twigs and bark are “speckled” with corky lentils, giving the plant its common name. Coarse, wrinkled leaves give this plant a “rough” appearance.



**Apple serviceberry (*Amelanchier X grandiflora*)**

15-25 feet tall by 10-20 feet wide.

This naturally occurring serviceberry hybrid is most commonly found as a shrub, but is easily trained and sold as a small tree. Spring flowers initially emerge with a slight pink tint, but lose this color when fully developed. Apple service berry has showy fruit which may be consumed by humans or left for birds and wildlife to enjoy.

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**Serviceberry (*Amelanchier* spp.)**

15-25 feet tall by 10-20 feet wide.

In addition to apple serviceberry, many species and varieties of serviceberry are abundant and often seen in the landscape as a large multi-stemmed small trees and shrubs. Each spring, brilliant white flowers completely envelope the crown of this tree. Fall color is also impressive, ranging from yellow-orange to red. The berries produced by serviceberry are consumed by birds, small mammals, and humans alike. Suckering may transform this small tree into thicket unless continuously maintained.



**American hornbeam (*Carpinus caroliniana*)**

20-30 feet tall by 20-30 feet wide.

American hornbeam is native to most of Eastern North America and parts of Central America. This attractive tree goes by many names, including blue beech and musclewood. Its smooth gray bark is accented with ridges that mimic rippling muscles. American hornbeam is adapted to wet sites and displays an attractive orangish-red fall color.



**Eastern redbud (*Cercis canadensis*)**

20-30 feet tall by 20-25 feet wide.

Eastern redbud is well known for its striking reddish-purple flowers in spring. In summer, this tree is easily recognized by its glossy heart-shaped leaves. Brown seed pods persist throughout winter. Eastern redbud is an attractive alternative to common non-native plants. Use a northern strain for best hardiness in zone 4.

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**Pagoda dogwood** (*Cornus alternifolia*)

15-20 feet tall by 15-20 feet wide.

Pagoda dogwood is a native plant that exhibits a unique layered branching structure. Small clusters of white flowers develop in the spring. Pagoda dogwood is intolerant of dry conditions and often exhibits twig blight and dieback when stressed. Related redbtwig, silky, and grey dogwood are shrub forms that nicely compliment pagoda dogwood in the landscape.



**Hawthorn** (*Crataegus* spp.)

15-30 feet tall by 15-30 feet wide.

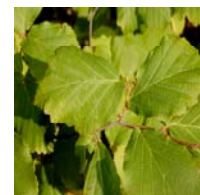
The hawthorn rivals crabapple in terms of the vast number of different hybrids and cultivars currently available. When selecting a hawthorn, a balance between disease resistance and flowering beauty is advised. As its name suggests, hawthorn has many sharp thorns. In the 1800s many Europeans used this tree as a protective hedge. Hawthorn berries are favored by songbirds.



**Witch hazel** (*Hamamelis virginiana*)

20-25 feet tall by 20-25 feet wide.

Witch hazel is one of the few temperate plants that flowers in late fall. These flowers persist throughout much of winter and add a unique seasonal interest. This multi-stemmed tree is easily identified by its wavy, oval leaves and arching form.



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**Chinese juniper** (*Juniperus chinensis*)

10-20 feet tall by 5-10 feet wide.

While Chinese juniper may grow as tall as 70 feet in the wild, most landscape plants are small growing shrub and tree forms. Care should be taken to ensure the cultivar selected matches the size requirements of the site. Habit ranges from spreading vase shape to compact conical form. Several varieties exhibit blue tinted foliage and berries.



**Eastern red cedar** (*Juniperus virginiana*)

10-30 feet tall by 5-15 feet wide.

This native plant is often found in dry, rocky soils and limestone bluffs. As a result it is both tolerant of drought and alkaline soils. However, eastern red cedar grows best in the fertile bottomlands of its native range. Berry-like cones provide a food source for birds.



**Amur maackia** (*Maackia amurensis*)

20-30 feet tall by 20-30 feet wide.

Amur Maackia is a slow growing tree well suited to small planting spaces. In spring look for long slender clusters of creamy white flowers. Amur maackia is extremely cold tolerant and virtually pest free.





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**Star magnolia** (*Magnolia stellata*)

15-20 feet tall by 10-15 feet wide.

Star magnolia is a slow growing deciduous tree with dense, dark green foliage. Spectacular white flowers make this tree a spring showpiece, while its unique bright pink fruit is a source of added interest in late summer and fall. Star magnolia is fairly adaptable and pest free, but may suffer in areas where the magnolia scale insect is established.



*Flowers*



**Loebner magnolia** (*Magnolia x loebner*)

20-30 feet tall by 15-20 feet wide.

Loebner Magnolia is a hybrid of star magnolia and kobus magnolia. The plants produce large white flowers early each spring. Flowers are showy, but tend to brown if exposed to a late frost.



*Flowers*



**Mugo pine** (*Pinus mugo*)

10-20 feet tall by 10-20 feet wide.

Mugo pine is often found as a broad, bushy shrub within the landscape. This pine is fairly resistant to drought and winter burn. Watch out for potential insects as the mugo pine is very susceptible to the pine needle scale and is the preferred host of the European pine sawfly.

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**American plum** (*Prunus americana*)

15-20 feet tall by 10-15 feet wide.

The American plum marks the beginning of spring with brilliant white flowers. Bears edible fruit that can be in jellies, jams, or desserts. While the American plum is considered a very low maintenance tree, it does have the tendency to sucker readily.



*Fruit*



**Newport cherry plum** (*Prunus cerasifera* 'Newportii')

15-20 feet tall by 15-20 feet wide.

With its reddish purple foliage, this plum (not a fruit tree) would make an excellent specimen plant within a landscape. Touted as the hardiest of the purple leafed plums, Newport cherry plum is tolerant of both clay and alkaline soils. However, it is susceptible to several pests and diseases, including verticillium wilt.



**Amur chokecherry** (*Prunus maackii*)

20-35 feet tall by 15-25 feet wide.

Amur chokecherry is most easily distinguished by its beautiful bronze, peeling bark. This prominent plant feature provides year-round interest. Amur chokecherry is very cold tolerant, features delicate clusters of white flowers, and produces a pitted fruit which attracts wildlife. This plant is virtually pest free.

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**Canadian plum** (*Prunus nigra*)

10-20 feet tall by 10-15 feet wide.

The Canadian plum features thorns similar to those found on hawthorn. While native to much of Dairyland's service area, this tree is much less common than its close relative, the American Plum. Most popular cultivars are prolific flowerers.



**Pin cherry** (*Prunus pensylvanica*)

25-30 feet tall by 20-25 feet wide.

This native cherry produces delicate clumps of white flowers each spring. In summer, small, red pitted cherries form which attract birds and other wildlife. Pin cherry is a fast growing, shrubby tree that is commonly found in sunny locations. The leaves of pin cherry are poisonous to livestock.



*Fruit and Leaves*



**Canada red chokecherry** (*Prunus virginiana* 'Canada Red')

20-25 feet tall by 15-20 feet wide.

Canadian red chokecherry is most easily distinguished by deep red foliage. This plant naturally grows as a large shrub, but may be trained as a tree early on in its life. Suckers should be routinely cut back to prevent this cherry from reverting back to its multi-stemmed form. As its name suggests, the Canadian red chokecherry produces small edible fruit that attract a variety of birds and animals. This chokecherry may

develop black knot, usually a benign, yet aesthetically disruptive disease.

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**Weeping willow pear (*Pyrus salicifolia*)**

15-20 feet tall by 10-15 feet wide.

This pear is distinguished by its silver foliage and pendulous branching habit. Originally from the Middle East, the weeping willow pear tolerates low quality, droughty soils. Other features of this pear include brilliant white spring flowers and inedible summer fruit. Weeping willow pear is highly susceptible to fireblight.



**American mountain-ash (*Sorbus americana*)**

20-30 feet tall by 15-20 feet wide.

This medium-sized tree features compound leaves and bright red persisting fruit. This fruit is a favorite of many birds but may become a nuisance if planted near a driveway or sidewalk. Young trees feature smooth, speckled bark that cracks and splits with age. Korean mountain-ash and European mountain-ash are similar trees.



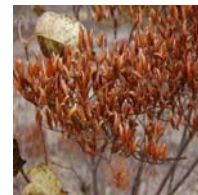
*Berries*



**Japanese tree lilac (*Syringia reticulata*)**

20-25 feet tall by 15-20 feet wide

Creamy white, fragrant flowers emerge in late spring and persist for several weeks. Japanese tree lilac may be multi-stemmed or trained as a single-tree form. Unlike other lilacs, Japanese tree lilac is fairly resistant to powdery mildew, scale insects, and borers.



*Fruit*

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**Arborvitae/White cedar** (*Thuja occidentalis*)

15-25 feet tall by 5-20 feet wide.

This native plant is very common in the landscape. Many cultivars exist with a variety of forms and habits. This evergreen is prone to winter burn and is a preferred browse of deer during the winter. Protective coverings will protect newly established plants from both.



*Columnar*



**Nannyberry** (*Viburnum lentago*)

15-25 feet tall by 15-25 feet wide.

Similar to the Wayfaring tree, nannyberry features white spring flowers, black summer fruit, and a deep red fall color. Nanny berry serves as a native alternative to its European counterpart. Nanny berry is susceptible to powdery mildew, a benign, yet aesthetically disruptive plant disorder.

**TREES THAT REGULARLY EXCEED 40 FEET IN HEIGHT THAT CAN NOT BE  
PLANTED BENEATH OR WITHIN 60 FEET OF TRANSMISSION LINES.**

<b><u>Common Name</u></b>	<b><u>Scientific Name</u></b>
American basswood	<i>Tilia americana</i>
American elm	<i>Ulmus americana</i>
Balsam fir	<i>Abies balsamea</i>
Bitternut hickory	<i>Carya cordiformis</i>
Black walnut	<i>Juglans nigra</i>
Boxelder	<i>Acer negundo</i>
Bur oak	<i>Quercus macrocarpa</i>
Colorado blue spruce	<i>Picea pungens</i>
Eastern cottonwood	<i>Populus deltoides</i>
Eastern hemlock	<i>Tsuga canadensis</i>
Eastern white pine	<i>Pinus strobus</i>
Ginkgo; maidenhair tree	<i>Ginkgo biloba</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Hackberry	<i>Celtis occidentalis</i>
Honey locust	<i>Gleditsia triacanthos</i>
Kentucky coffeetree	<i>Gymnocladus dioicus</i>
Northern red oak	<i>Quercus rubra</i>
Norway spruce	<i>Picea abies</i>
Paper birch	<i>Betula papyrifera</i>
Red maple	<i>Acer rubrum</i>
Red pine	<i>Pinus resinosa</i>
River birch	<i>Betula nigra</i>
Silver maple	<i>Acer saccharinum</i>
Sugar maple	<i>Acer saccharum</i>
Swamp white oak	<i>Quercus bicolor</i>
White ash	<i>Fraxinus americana</i>
White oak	<i>Quercus alba</i>
White spruce	<i>Picea glauca</i>
Willow	<i>Salix sp.</i>