Like children, windbreaks require a little nurturing and maintenance in the early years. Protect your planting from livestock and fire. These young plants are especially attractive to cattle. Your investment of time and money is well spent protecting with a fence.

Weed control in the first three years after establishment is very important. Within the first year, invading grasses and weeds can threaten a young windbreak. This weed control is best accomplished with herbicides, but cultivation, mowing, mulches, and hand weeding are all effective alternatives. The reduction of heavy grass buildup around the plants reduces habitat for robins, mourning doves, and blue jays, among others. The material is frequently used for nesting. It is a preferred food for wood ducks, cardinals, and grosbeaks.

Weed control in the seedling stage with a sharp grub hoe is the most efficient way to remove them.

Table 2. Recommended species for each row in windbreak planting.

<table>
<thead>
<tr>
<th>Windrow Row (Row 1)</th>
<th>White Cedar</th>
<th>Ninebark</th>
<th>White Spruce</th>
<th>Wild Plum</th>
<th>Dogwoods</th>
<th>American Highbush Cranberry</th>
<th>American Hazelnut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Row (Row 2)</td>
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<td>Red Oak</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>
WINDBREAKS

Wisconsin Department of Natural Resources

Species Descriptions

Dogwoods

The dogwoods (Stilby, Red-berried, and Gray) are native to Wisconsin and extremely winter hardy. All species spread from underground stems and attain heights of 4–10 feet. Spring flowers typically bloom in May and produce white to blue berry-like fruit in August. It is heavily browsed by deer and a preferred food of turkeys, grouse, etc. It is also an important cover plant for a variety of species. Site Preference: moist to well-drained soils in sun or shade although does its best in full sun.

Ninebark

Ninebark develops into a multi-stemmed, arching shrub about 10 feet tall at maturity. The bark peels into paper strips resembling “lo” Nervous clusters of small white flowers in late May develop into brownish capsules in September. Ruffled grouse eat the buds and songbirds eat the small seeds. Ninebark makes excellent wildlife cover. Site Preference: one of the few shrubs that will grow on very droughty soils; found on dry prairies and sedge meadows.

Hawthorn

Grows as a single-stemmed small tree, 20–24 feet tall, with laterally spreading thin branches. Blooming occurs prior to leaf-leaf in early May. Fruits start maturing in mid-August. Ruffed grouse eat the buds and songbirds eat the small seeds. Hawthorn makes excellent wildlife cover. Site Preference: prefers full sunlight, wide range of silt loams; avoid moist or wet sites as well as extremely droughty areas.

American Highbush Cranberry

Large shrub, 10–15 feet tall at maturity, with attractive white flower clusters in May producing bright orange-red fruits in September. The persistence of the fruit throughout the winter suggests it is not very palatable to most birds. However, the fact that it is persistent makes it a valuable emergency food source for snowshoe hares. Site Preference: requires well-drained to moist soils for best development.

American Hazelnut

Hazelnut is a medium-sized shrub, 8–15 feet tall, that is common throughout Wisconsin. The nuts are enclosed in flat, ragged-looking husks which mature in late summer. Hazelnuts are an excellent food source to deer, squirrels, chipmunks, blue jays, turkeys, and grouse. Site Preference: grows on a variety of soil types, including sandy soils; grows best in full sunlight.

Green Ash

Green ash is a small hardwood tree, growing 50–60 feet tall. The dark brown or gray bark is lipped with red curving with flat, scaly ridges. The leaves are opposite and compound, 10”–12” long with 7–9 leaflets, each 3”–4” long. Leaves turn yellow in the fall. Its heavy seed crops (samaras borne in clusters) are the preferred food of robins, mourning doves, and blue jays, among others. Site Preference: grows on sandy soils and rocky ridges, but prefers fertile well-drained soils.

Northern Red Oak

Oak is a medium-sized deciduous tree, growing 60–80 feet tall. The bark is nearly black with shallow furrows and wide, smooth, light gray ridges. The leaves are 5”–6” long with 7–11 sharply tipped lobes. Red oak acorns are an excellent food source for deer, squirrels, turkey and a variety of wildlife. Site Preference: grows best on fertile, well-drained soils, but adapts to a variety of sites.

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Large shrub, 10–15 feet tall at maturity, with attractive white flower clusters in May producing bright orange-red fruits in September. The persistence of the fruit throughout the winter suggests it is not very palatable to most birds. However, the fact that it is persistent makes it a valuable emergency food source for snowshoe hares. Site Preference: requires well-drained to moist soils for best development.

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Red Pine

Red pine usually grows 60–80 feet tall. Red pine gets its name from the large reddish brown plates visible on the bark as the tree matures. The dark green needles are 8”–¼” long, yellowish to bright green, and appear to make the branches flat. Its thick branching pattern and dense foliage afford protective cover for birds and is frequently used for nesting. It is a preferred food for deer. Site Preference: occurs on a variety of soils, doing well in most soils, but actually growing more rapidly on well-drained sites.

Eastern White Pine

Native to northern Wisconsin, it produces short blue-green needles with sharp points. Cones are 4”–6” long and mature in August or September of the second season. White pine is a frequent nest site of robins, mourning doves, and blue jays, among others. The rapid growth of white pine makes it ideal for wildlife cover. Site Preference: grows on sandy soils and rocky ridges, but prefers fertile well-drained soils.

White Spruce

Native to northern Wisconsin, it produces short blue-green needles with sharp points. Cones are 4”–6” long and mature in August or September of the second season. White pine is a frequent nest site of robins, mourning doves, and blue jays, among others. The rapid growth of white pine makes it ideal for wildlife cover. Site Preference: grows on sandy soils and rocky ridges, but prefers fertile well-drained soils.

Northern White Cedar

White cedar is a compact, pyramid shaped tree reaching a height of 40–50 feet. The small, scale-like leaves are ¼”–½” long, yellowish to bright green, and appear to make the branches flat. Its thick branching pattern and dense foliage afford protective cover for birds and is frequently used for nesting. It is a preferred food for deer. Site Preference: occurs on a variety of soils, doing well in most soils, but actually growing more rapidly on well-drained sites.
Introduction

As any woodland owner knows, growing trees is gratifying. But tree growers must be patient. This is especially true in planting windbreaks. It takes awhile to establish a good windbreak, but you will find the benefits well worth the investment.

What is a windbreak?

A windbreak is a tall, dense, continuous wall of vegetation. The height determines how far wind protection extends, and the density determines the degree of protection. The general rule is that a windbreak will reduce wind to a distance of 10 times its height and reduce wind speed 70 to 80 percent immediately inside the barrier. There are two kinds of windbreaks: field windbreaks and farmstead windbreaks.

Field Windbreaks

The primary purpose of a field windbreak is to control soil erosion, conserve soil and plant moisture by lowering evaporation rates, and prevent crop damage and loss caused by wind. Field windbreaks are one of the most important conservation practices in areas with relatively flat landscapes and light sandy or organic soils. Field windbreaks commonly have only 1–3 rows of plants due to space limitations but will protect the soil a distance of up to 10 times the height of the trees. With a field windbreak, not only will you save valuable topsoil, you will likely see an increase in crop yield in the area protected.

Great Planting Procedures

Soils

Most of the tree and shrub species available today are suited for well-drained, loamy soils for best development and growth. If you have shallow soils (6" or less to bedrock), sandy soils with very low fertility, or poorly drained soils, contact the local DNR forester or Natural Resources Conservation Service (NRCS) for appropriate species information.

Plan for Growth

As your windbreak grows, the taller trees can create hazards if they are too close to the road. Plantings must be at least 30 feet from the edge of a roadway to prevent winter icing in shady spots and to prevent obstructing motorists’ vision. A windbreak that will be north or west of a building or road must be planted at least 45 feet from the edge to eliminate snow drifting (Figure 3). Watch out for overhead utility lines. Trees and tall shrubs need to be at least 20 feet from utility lines to allow maintenance vehicles to pass and to preventHAND planting from interfering with lines. Remember not to plant over the easement or underground utilities.

Designing Your Windbreak

A standard farmstead windbreak has at least three rows: the outside or windrow; one or more interior rows; and the inside or leeward row. Four to six rows provide greater protection, with relatively flat landscapes and light sandy soils. Four to six rows provide greater protection, with relatively flat landscapes and light sandy soils.

The single most important part of establishing a windbreak is the choice of species. The species must be well suited to Wisconsin weather and soils, be able to grow and live together as a windbreak, have minimal weed problems, and have relatively low maintenance requirements. For more specific species information, contact your local DNR forester for specific species recommendations. Note: All herbicides must be applied in accordance with local regulations.

Site Preparation

The standard DNR windbreak packet contains 200 spruce and 100 white or red pine—enough stock to plant a 3-row windbreak that is 800 feet long. The ideal planting design for your windbreak is illustrated in Figure 1. Plan on leaving 10–20 feet between rows so you will have room to get in with mowing equipment long into the life of your windbreak. Distance required between plants varies by species (Table 1). To offer wind protection earlier in the life of the planting, the second row should be offset (staggered in spacing) from the plants in the first and third rows (Figure 1).

For the windward and leeward rows, plant a shade-tolerant conifer that won’t lose its lower limbs as it matures. White spruce is a good choice because it will still provide a barrier near the ground even as it grows taller. For the interior row, use a tree species that will add height, so choosing something at least as tall as the outside row. White pine, red pine, or green ash are good choices. Refer to Tables 1 and 2 for additional information on recommended species and spacing for your windbreak planting.

Mechanical Site Preparation

You can set back grass competition in a planting site with a heavy sod by rototilling, fall-plowing and/or discing in 6 foot wide strips leaving undisturbed sod between rows. By minimizing the amount of soil you disturb, you reduce the threat of soil erosion and weed seed invasion by such things as Canada thistle. Spring plowing is discouraged as it will introduce air into the soil which can lead to desiccation (drying) of the roots of newly planted stock.

Good Planting Procedures

Care of Nursery Stock

Prior to Planting

When lifted and packaged at the nursery, bare-root seedlings are very perishable products. Extreme care is needed to avoid drying out the root system and overheating the seedlings prior to planting. Many windbreak packets are shipped in a sealed, Tacky-Kraft paper bag with a poly-coated liner. No root wrapping material is added. Therefore, a tear in the bag should be repaired immediately so air entering the bag will dry out the roots quickly. Ideally, the bags of seedlings should be kept in a cooler at 34–38°F until planting. Otherwise, short-term storage in a cool cellar is acceptable. It is not recommended that the seedlings be taken out of the bag and heeled in. The more you handle these bare-root seedlings, the more damage is done to the fragile root structures. The bags can be opened to inspect the seedlings for temperature buildup or dryness. If a temperature buildup of 60°F or more is observed, the seedlings should be taken out of the bags, cooled with cold water, and placed back in the bags.

Planting Time

April is tree planting time in Wisconsin. Plant after the frost has left the ground, but before heavy bud break and shoot elongation (late May). Prior to planting, it is best to stake the rows to keep the planters oriented and on line.

During planting, keep the roots moist. However, do not soak them in a bucket of water. A wet “gunny” sack laid over the roots will help keep the roots from curling and the tree should be planted at the same depth as it was growing. A wet “gunny” sack laid over the roots will help keep the roots from curling and the tree should be planted at the same depth as it was growing. During planting, keep the roots moist. However, do not soak them in a bucket of water. A wet “gunny” sack laid over the roots will help keep the roots from curling and the tree should be planted at the same depth as it was growing.

Herbicides should not be allowed to come in contact with the tree roots. Very dry conditions will limit the effectiveness of most herbicides. Be sure to follow label directions for application rates, as rates differ depending on soil type and herbicide. Consult with your local DNR forester for specific herbicide recommendations. Note: All herbicides must be applied in accordance with local regulations and their registered use.

Site Preparation

What is a windbreak?

A windbreak is a tall, dense, continuous wall of vegetation. The height determines how far wind protection extends, and the density determines the degree of protection. The general rule is that a windbreak will reduce wind to a distance of 10 times its height and reduce wind speed 70 to 80 percent immediately inside the barrier. There are two kinds of windbreaks: field windbreaks and farmstead windbreaks.

Farmstead Windbreaks

Farmstead windbreaks provide wind protection for the home, farm buildings, feedlots, and livestock enclosures. The colder and most damaging winds come from the north and west. You will want to orient your windbreaks perpendicular to the wind, on the north and west sides of your home or farmstead.

Advantages of Windbreaks

Windbreaks block a driving wind so that working outside becomes more comfortable in summer and in winter. A good windbreak can reduce home heating costs 10 to 15 percent. Building maintenance costs are reduced too, as a windbreak lessens the sandblasting effects of wind on house paint. A windbreak is also a sound barrier, since a tall dense windbreak will dull the noise of traffic, machinery, and animals. Shrubs and trees attract wildlife, are pleasant to look at, and add variety to the landscape. Windbreaks provide a cool escape in summer, a shelter in winter, and as a living snow fence will keep the snow drifts off your driveway. A in all, a windbreak is a valuable asset to any property and a sound investment.

Good Planting Procedures

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Chemical Site Preparation

Weedy or grassy competition can be controlled with selective herbicide use. Effective control depends on four factors: timing of application, herbicide selected, weather conditions, and application rate.

Heavy soil can be controlled by a fall application of herbicide in the year prior to planting. Alternatively, a pre-emergent herbicide can be applied in the spring just after the trees are planted and before the existing grass cover has “greened up.” Herbicides should not be allowed to come in contact with the tree roots. Very dry conditions will limit the effectiveness of most herbicides. Be sure to follow label directions for application rates, as rates differ depending on soil type and herbicide. Consult with your local DNR forester for specific herbicide recommendations. Note: All herbicides must be applied in accordance with local regulations and their registered use.
Long Term Maintenance

Like children, windbreaks require a little nurturing and maintenance in the early years. Protect your planting from livestock and fire. These young plants are especially attractive to cattle. Your planting should also be protected from deer. Your planting needs protection from wild fires. These young plants are especially attractive to cattle. Your planting needs protection from wild fires.

Weed control is important in the first three years after establishment. It is very important. Within the first year, invading weeds can threaten a young windbreak. Weed control is best achieved with herbicides, but cultivation, mowing, mulches, and hand weeding are also effective. A good job of weed control reduces habitat for mice and voles.

Replace dead trees and shrubs every spring until you have 100 percent survival. Normally, replacement is made the following season and requires hand planting. Newly planted windbreaks are subject to invasion by many undesirable species such as willow, box elder, elm, honeysuckle, and buckthorn. Hand removal in the seedling stage with a sharp grub hoe is the most efficient way to remove them.

To find out how to get in touch with your local DNR forester, wildlife manager, or NRCS, contact:

DNR, Division of Forestry or Bureau of Wildlife Management
Box 7922
Madison, WI 53707-7922
www.dnr.state.wi.us/org/land/forestry
www.dnr.state.wi.us/org/gland/wildlife
NRCS
6515 Watts Road
Madison, WI 53719
www.nrcs.usda.gov/

The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240. This publication is available in alternative format (large print, Braille, audio tape, etc.) upon request. Please call 267-7494 for more information.

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U.S. Department of Agriculture, Natural Resources Conservation Service-Wisconsin

Wisconsin Department of Natural Resources Division of Forestry

Table 1. Recommended species and spacing for windbreak plantings.

<table>
<thead>
<tr>
<th>Shrub Type</th>
<th>Species</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogwoods</td>
<td>American Highbush Cranberry</td>
<td>4 feet apart in rows and 6 feet apart between rows</td>
</tr>
<tr>
<td></td>
<td>American Hazelnut</td>
<td></td>
</tr>
<tr>
<td>Ninebark</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conifers</td>
<td>White Pine</td>
<td>8 feet apart in rows and 10 feet apart between rows</td>
</tr>
<tr>
<td></td>
<td>White Spruce</td>
<td></td>
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<tr>
<td></td>
<td>White Cedar</td>
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<tr>
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<td>Red Pine</td>
<td></td>
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<tr>
<td>hardwoods</td>
<td>10 feet apart in rows and 10-15 feet apart between rows</td>
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<tr>
<td></td>
<td>Green Ash</td>
<td></td>
</tr>
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Table 2. Recommended species for each row in windbreak planting.

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<th>Windrow Row (Row 1)</th>
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</tr>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior Row (Row 2)</td>
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The most efficient way to remove them.

Newly planted windbreaks are subject to invasion by many undesirable species such as willow, box elder, elm, honeysuckle, and buckthorn. Hand removal in the seedling stage with a sharp grub hoe is the most efficient way to remove them.

Effective alternatives. The reduction of heavy grass buildup around the plants reduces habitat for invading grasses and weeds can threaten a young windbreak. This weed control is best accomplished with herbicides, but cultivation, mowing, mulches, and hand weeding are all effective. If, after a period of time, invasions of different species become a problem, additional plantings may be indicated. The most effective way to deal with these is to replace the entire windbreak with a problem-free species. An excellent alternative to this is to include several species that function as a natural barrier to weed species. In addition to the Northern White Cedar, White Pine, White Spruce, and the Dogwoods, other species are recommended where these are not available or desirable.

For More Information

For additional information on the benefits of windbreaks and ordering seedlings, contact your local DNR forester, wildlife manager, or NRCS District Conservationist.

The Natural Resources Conservation Service (NRCS) can help you plan an effective windbreak for your farmstead or fields. NRCS provides technical assistance to private landowners at no charge.

The Farm Services Agency (FSA) may cost-share with agricultural producers on establishing windbreaks. Most counties have access to mechanical tree planters through the county Land Conservation Department (LCD). The local LCD foresters usually coordinate the rental of the mechanical tree planters. Many LCDs also have tree and shrub seedling programs.

To find out how to get in touch with your local DNR forester, wildlife manager, or NRCS, contact:

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Snow Trap (optional) | Dogwood | Ninebark | American Hazelnut |

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Weed control in the first three years after establishment is very important. Within the first year, invading grasses and weeds can threaten a young windbreak. This weed control is best accomplished with herbicides, but cultivation, mowing, mulches, and hand weeding are all effective. Hand weeding is the most efficient way to remove them.

Replace dead trees and shrubs every spring until you have 100 percent survival. Normally, replacement is made the following season and requires hand planting.

Newly planted windbreaks are subject to invasion by many undesirable species such as willow, box elder, elm, honeysuckle, and buckthorn. Hand removal in the seedling stage with a sharp grub hoe is the most efficient way to remove them.