Farmstead Windbreaks: Establishment, Care, and Maintenance

Appropriate selection of species for use in the windbreak, followed by good establishment methods, care, and management, will ensure long-term wind protection in Iowa.

Species selection

The species to select for use in the farmstead windbreak depends on soil characteristics and location in the state, as well as the personal preferences of the windbreak planner. **Never use a single species for the windbreak.** Use as diverse a mix of species as the site and conditions will allow. At the very minimum use as many different species as there are rows in the windbreak. Greater diversity can be achieved by block planting different species (figure 1). Large windbreaks and windbreaks with a greater diversity of species are better for both wind reduction and wildlife habitat

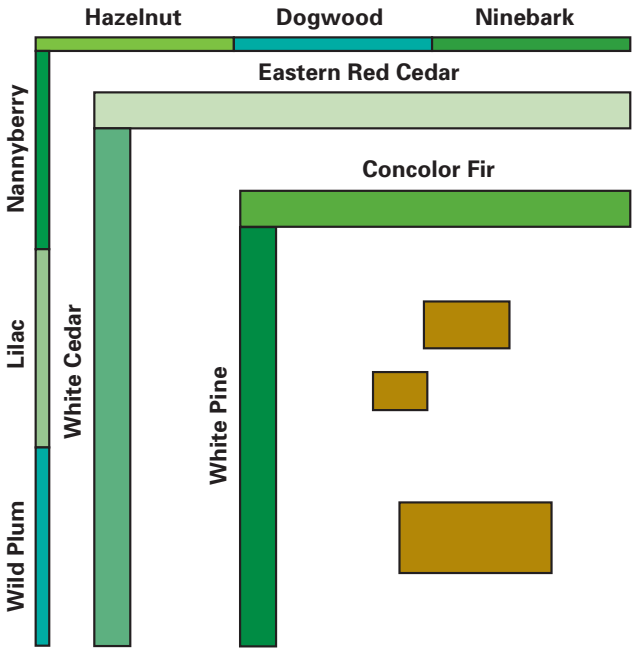

Figure 1. Species diversity makes a better windbreak.

Conifers

If possible, use conifers in the windbreak because they retain their leaves during the winter months. However, some sites may not be suitable for conifers. Five to eight rows of deciduous trees are required to produce the same wind reduction as two rows of conifers.

Conifers are more sensitive to site and soil conditions than deciduous trees. The most limiting factors for conifers are soil moisture and soil pH. Ideal sites for conifers are soils that are acidic (pH less than 7) and well drained. As soils become less well drained and more basic, conifer growth and survival will be less likely. Do not plant conifers in soils that are poorly drained or have a pH greater than 7.6 to 8.0.

Conifers commonly used for windbreaks in Iowa are eastern red cedar, concolor fir, Douglas fir, white spruce, Black Hills spruce, Colorado spruce, Norway spruce, red pine, jack pine, white pine, ponderosa pine, and arborvitae. Due to problems with disease, Scotch pine is no longer recommended for windbreaks. Instead, use Colorado spruce or Ponderosa pine. Deciduous conifers (larch and bald cypress) contribute no more than deciduous trees to the windbreak. For more information on individual species and site adaptability, see Iowa State University Extension publications *Tree Planting: Planning* (Pm-1676) and *Community Trees: Conifer Species for Iowa* (Pm-1429g).

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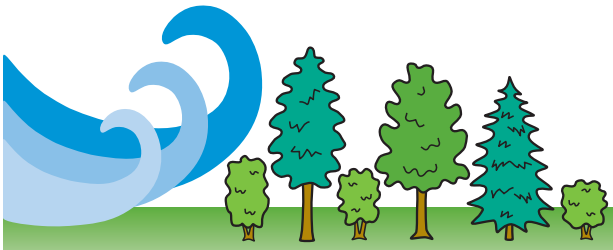

Deciduous

Deciduous trees may be used as a component in a windbreak or when site conditions prohibit the use of conifers. A deciduous windbreak should include at least five rows of trees, or be established as a one- to five-acre "grove" on the north and west sides of the property. Fast-growing deciduous trees may provide some wind protection sooner when combined with conifers in the windbreak.

Deciduous trees can be matched to most sites in Iowa through species selection. Common fast-growing species used in windbreaks are hybrid poplar, cottonwood, silver maple, hackberry, green ash, and hybrid willow. Use caution when selecting both hybrid poplars and hybrid willows because of potential disease problems. Other slower growing deciduous species for windbreak use include red oak, bur oak, white oak, swamp white oak, black oak, black walnut, and white ash. Windbreak planners should not be limited by this list. Many other species may be appropriate for windbreak use. For more information see ISU Extension publication *Tree Planting: Planning* (Pm-1676).

Shrubs

Shrubs are important to a windbreak for early snow capture and for filling in the lower portion of the windbreak as it matures. Through appropriate selection and planting, shrubs may have great benefit to wildlife because of fruit or seed production. Use several different species, planting in blocks of 10 to 50 plants (figure 1).

Shrub species commonly used for windbreaks include serviceberry, Pagoda dogwood, gray dogwood, red osier dogwood, silky dogwood, wild plum, choke cherry, sumac, Nanking cherry, hazelnut, nannyberry, black haw, Amur maple, lilac, and ninebark. As with all woody plants, match species of shrub to the site and soil conditions. To get more information about shrub species selection, observe which species perform well locally or consult with ISU Extension or Iowa Department of Natural Resources foresters.

Establishment

Begin planning the windbreak the fall before the anticipated spring planting. Fall is the time to prepare the site, arrange for nursery stock, and provide for weed control. Spring is the best time to plant a windbreak; however, with some nursery stock such as container-grown or balled-and-burlap stock, the season can be expanded. Obtain windbreak trees from a reliable commercial nursery. Seedlings from the state nursery cannot be used for farmstead windbreaks. For more information on tree planting see ISU Extension publications *Tree Planting: Establishment and Care* (Pm-1677) and *Tree Planting and Care Pocket Guide* (Pm-1591).

Site preparation

Windbreak plantings will benefit from good site preparation. Use herbicides or tillage to eliminate perennial competing vegetation where trees are to be planted. If establishing grass between rows of trees, use less competitive grass species, such as blue grass, timothy, or fine fescue; avoid brome, reed Canarygrass, and tall fescues.

Planting stock

Several choices exist for planting stock. Bare root seedlings or transplants are appropriate for shrubs and deciduous trees. Using seedling stock for conifers may result in delays in the establishment of the windbreak. Using transplants, or potted, container-grown, or balled-and-burlap stock results in higher conifer survival and better establishment rates. Larger stock may allow the windbreak to become functional in a shorter period of time. Avoid using stock that does not have a balanced root-to-top ratio; this stock often grows poorly or does not survive. The greater the amount of roots compared to the top, the better the plants will recover from transplant shock and resume normal growth.

Planting techniques

Use good planting techniques. Make the hole 20 to 40 percent wider than the root system to allow for root expansion and development. Avoid planting too deep. Plant at the same level or one-half inch deeper than the

plants grew in the nursery. Don't plant with parts of the root system exposed. Remove all pots, plastic, or fiber, and as much of the burlap as possible on balled-and-burlap trees.

If watering is part of the planting process, water after the soil has been replaced. For regular watering during the first year, create a basin to hold water around the tree or install an inexpensive drip irrigation system for the windbreak.

Mulching will provide many benefits to the planted windbreak stock. Four to six inches of mulch provide many benefits to the trees. Mulch conserves moisture, reduces temperature extremes around the root system, keeps lawnmowers away from the trunk, provides weed control, and provides nutrients. The best mulch materials are wood chips or bark. Other organic materials (except manure) may be used, but may not last as long.

Care and maintenance

Windbreak care and maintenance is in some cases similar to care of other trees in the landscape, but in other ways quite different. Failure to provide some minimal care may result in a windbreak that is less functional and has a shorter life span.

Watering

Proper watering during the one- to two-year establishment period is critical. Water well, but don't water too frequently. Water every seven to 14 days if at least an inch of rain has not been received. When watering, make sure the entire root system is moistened, but allow enough time between waterings so the soil can dry.

Pruning

Maintain a single main stem in conifers and large deciduous trees for as long as possible. Correct multiple stems as soon as they occur. Don't prune the lower branches; maintain as much foliage as possible to improve the function of the windbreak.

Weed control

Continue weed control until the trees begin to control the competing vegetation. Keep the grass and weeds away from the trees and shrubs to help them maintain their lower foliage. Weed/grass competition control includes chemical control, mulches, cultivation, or barriers. Mowing is not weed control, but may be used to control grasses between rows and between trees within a row.

Protection

Windbreaks are subject to damage from various agents. Keep **all** livestock out of windbreaks. They browse, break limbs, remove bark, or compact the soil, all of which cause serious damage to the windbreak.

Rodent damage by rabbits, mice, ground squirrels, or gophers is most severe when trees are young. Habitat elimination or reduction may be the first line of defense. For other control measures contact your ISU Extension wildlife specialist or DNR wildlife biologist.

All tree plantings may be subject to insect and disease attacks. Many tree pests do little or no damage and require no control. Some damaging agents will require identification and control practices. ISU Extension Plant Pathology and Entomology can assist in pest identification and make control recommendations if necessary. Contact your ISU Extension county office.

Windbreak management

Good management of windbreaks should maintain and improve the vigor of individual trees, maintain and improve the structure and function of the windbreak, and promote the longevity of the windbreak.

Thinning

Trees and shrubs that were initially planted at close spacing to become functional early may require some thinning later to maintain their effectiveness. Look for signs of deterioration in crowded windbreaks including premature loss of foliage, poor color, reduced live crown, reduced annual growth, and increased incidences of disease and insects.

Thinning may take several forms depending on the windbreak. In some cases, thinning around a tree needing more space can be accomplished on an individual tree basis. Removing every other tree in a row or eliminating an entire row may be necessary to maintain the lower crown and foliage in the windbreak. Volunteer woody vegetation may need to be controlled in windbreaks to reduce competition.

Sprouting

Many deciduous trees are prolific sprouters when young; thinning or removing them may result in dense sprouting to maintain lower level density. Most shrub species maintain their ability to sprout and renew themselves even when old. For maximum sprouting, harvest during the dormant season when root food reserves are highest.

Natural reproduction

Some windbreaks, usually hardwood groves as they grow older, may begin to replace themselves either with the original species or other non-planted species. These "woodlands" can, with some traditional woodland management, maintain themselves, providing both wind protection and traditional woodland crops. With management and some assistance, the landowner can control or favor the most desirable species through thinning, weed tree eradication, and crop tree selection techniques used in traditional woodland management in Iowa.

Windbreak replacement/rotation

Many farmsteads can have continuous wind protection by establishing two rotating windbreaks 20 to 30 years apart on adjacent land areas. As an older windbreak begins to become less functional, establish a new windbreak adjacent to it. When the new windbreak becomes functional, rejuvenate or re-establish the older windbreak. This concept provides continuous improved protection and more benefits than the standard, minimum windbreak in Iowa.

Farmstead Windbreaks: Planning (Iowa State University Extension publication Pm-1716) provides information about benefits and design considerations. Additional technical information is available from your ISU Extension county office, or Iowa DNR district foresters or wildlife biologists. For on-site technical assistance and potential cost-share assistance, contact your county Natural Resources Conservation Service (NRCS) office.

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