



## *Planning and Planting a Five-Row Windbreak*

Yvonne C. Barkley, Annette D.L. Brusven, R. Kasten Dumroese, David L. Wenny & Anthony S. Davis

Idaho offers us many benefits - sun, rain and snow, fertile soils, clean water, fresh air, scenic vistas, and rivers, forests, and rangelands full of fish and wildlife. But Idaho also offers us wind - wind that moves soil and snow to where it should not be, creating hazards that cost dollars and loss of life.

Windbreaks have been here as long as man has lived in this part of the world. Designs were simple and success variable. Much depended on the knowledge of the person installing the windbreak of tree and shrub species suitable for the local climate, the prevailing wind velocities and currents, and the placement and spacing of the plants.

Over the years, research has resulted in excellent recommendations for the design, placement, and maintenance windbreaks, resulting in high levels of windbreak performance.

A properly designed and maintained windbreak provides many benefits to you and the environment.

Benefits include:

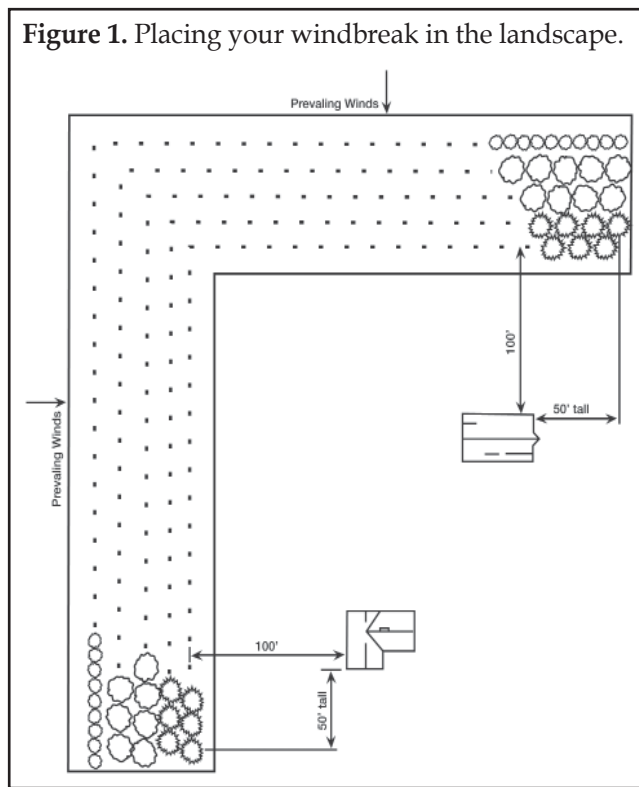
- **home energy conservation.** Windbreaks can decrease winter heating costs 10% to 40% and reduce cold air infiltration into your home by 75%.
- **improved crop yields.** Yields are higher on the lee sides of windbreaks - anywhere from 5 to 44% - because lower wind speeds evaporate less moisture from the soil and plants. True, the first few rows next to the windbreak will not grow as well, but the area of best soil and crop protection extends to 10 times the height of the windbreak.

- **reduced soil erosion.** A windbreak will decrease wind speed close to the ground up to 50%, lessening the wind's ability to blow away topsoil and, with it, productivity.
- **better livestock performance.** The energy requirements for beef cows increases 13% for each 10° F drop in windchill temperatures below 30° F. That means when it's 10° F and the wind is blowing 25 miles per hour (-29° F windchill), cows use 77% more energy when standing outside just to stay warm. A windbreak would reduce that consumption by more than half.
- **snow drift control.** A properly placed windbreak will keep snow from drifting across your driveway, farm lane, or access roads - a big advantage when it's time to plow.
- **wildlife habitat.** Wildlife will use windbreaks for cover, food, and reproduction. For example, birds, which are important predators of insects and rodents, commonly nest in windbreaks. Studies have shown 50 to 80 bird nests per mile of windbreak. Windbreaks planted east to west provide the best wildlife benefit. Plant food-bearing shrubs in the outer rows such as currants, plums, cherries, and roses. Good evergreens are types that don't grow too tall, but stay dense and bushy like Rocky Mountain juniper, Austrian pine, and Colorado blue spruce.
- **increased home value.** Healthy trees around your home provide shade and add value to your property.

## Planning Your Windbreak.

Your windbreak will be a long-term investment. Careful planning at the beginning will give you maximum protection and satisfaction, as well as reducing the need for more work later.

**Placing your windbreak in the landscape.** The placement of your windbreak is the most important aspect of the whole project. Windbreaks often look better when they follow natural contours, but locating the windbreak at right angles to the prevailing wind will be most effective and provide greater benefits (Figure 1).



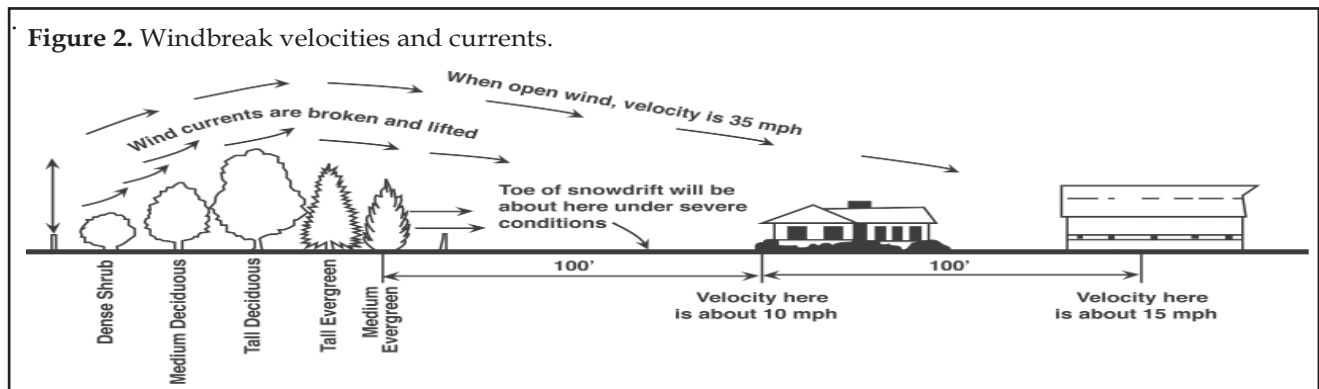
The outermost row of the windbreak should be at least 150 feet from your home or feedlot. This allows room for snow drift and storage (Figure 2.). Plan to extend the windbreak 50 to 100 feet beyond the boundaries of your home or feedlot to prevent wind from whipping around the windbreak and into your protected area.

**Determining the number of rows needed.** Available space will determine the number of rows you can plan for your windbreak. A five-row windbreak is a common design that provides excellent protection. Keep in mind that protection increases with the number of rows planted and that you need to allow room for trees to grow to maturity.

**Determining the number of seedlings you will need.** In order to determine the number of seedlings you need for your windbreak, you need to know how far apart to place your plants. Adequate growing space between plants assures a longer, more useful life for your windbreak. The recommended spacings (see Figures 3 and 4) look quite large when planting small seedlings, but the trees will grow rapidly to fill the area. If limited space prevents planting a 5-row windbreak, use fewer rows rather than crowding the plants. Crowded plants grow more slowly, stop growing at an earlier age, and are more susceptible to insect and disease problems.

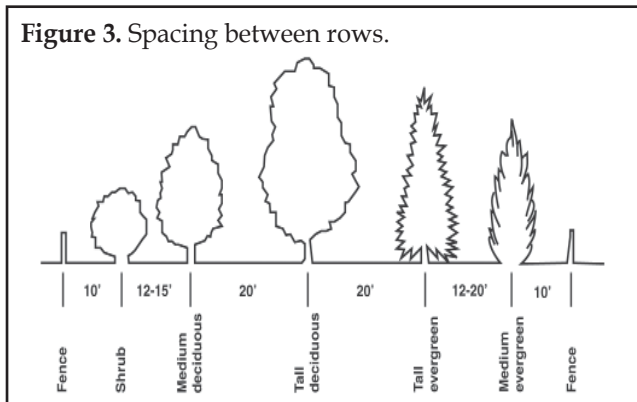
In general:

- Row spacing should be at least 4 feet wider than cultivation equipment.
- Tall deciduous trees should be at least 20 feet from shrubs and evergreen trees.

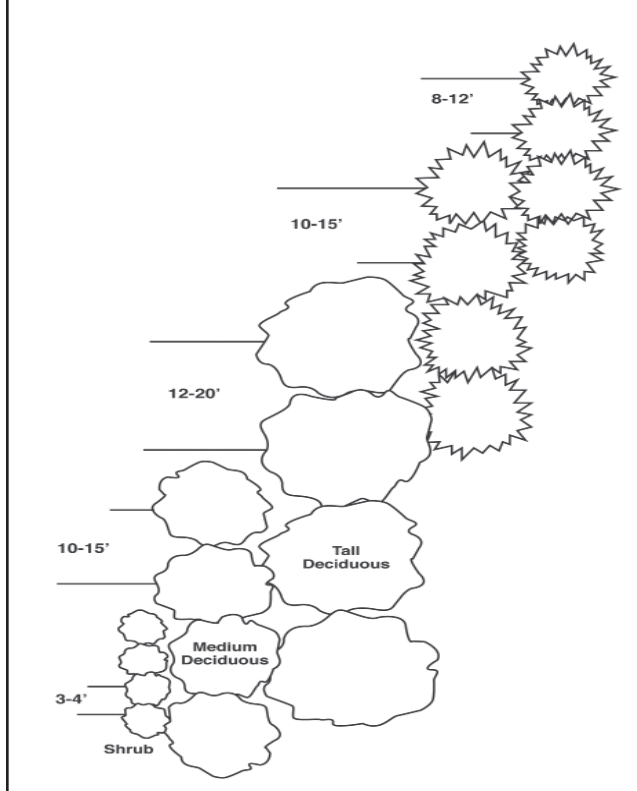


- Use closer spacings in the windward row and in windbreaks with only 2 rows.
- Wider spacings will work better in the interior and lee rows of multiple-row windbreaks and in areas with lower precipitation.

**Calculating the number of seedlings needed.** To determine the number of trees and shrubs you will need, divide the length of each row by the in-row spacing - this will give you the number of seedlings you need for each row. Do this for each row, then



**Figure 4.** Spacing between seedlings in each row.



add the totals for each row together to get the final number needed for the windbreak.

**Plant material selection.** Where you live, as well as the number of rows and the benefits you want to derive from your windbreak, will help you select your plant materials. See Tables 1 and 2 (on page 4) for tree and shrub recommendations for windbreaks for your area.

Windbreaks with:	First choices	Second choices
5 rows	dense shrub medium evergreen tall deciduous tall evergreen medium evergreen	dense shrub medium deciduous tall deciduous tall evergreen medium evergreen
4 rows	dense shrub medium evergreen tall evergreen medium evergreen	dense shrub medium deciduous tall evergreen medium evergreen
3 rows	dense shrub tall evergreen medium evergreen	dense shrub tall deciduous medium evergreen
2 rows	medium evergreen tall evergreen	dense shrub tall evergreen
1 row	tall evergreen	medium evergreen

### Planting a Successful Windbreak.

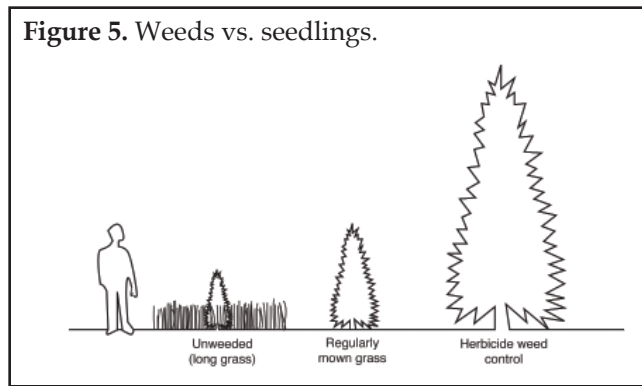
1. Weed competition is the number one cause of seedling death. Clean cultivate the planting area BEFORE your seedlings arrive. **If weeds are a problem**, especially perennial weeds such as thistle or bindweed, herbicide applications may be necessary. Please consult your county Extension agent before using herbicides as carryover effects may damage your seedlings.
2. Plant your seedlings according to the instructions shipped with your order. Plan to have a shovel or hoedad ready to use when your seedlings arrive. Dibble planting is not recommended as this method has been found to compact the soil and reduce seedling survival and growth.

3. Use a weed barrier such as Typar® that allows water and air to pass but prevents weed establishment. A 6-foot-wide strip is the minimum recommended width.
4. Cover the weed barrier with a mulch of wood chips or decorative rock. This will increase the life of the weed barrier, make the barrier more effective, and preserve soil moisture.
5. Use a pre-emergent herbicide such as Pendulum AquaCap® to keep weeds from sprouting on the mulch. Always dress appropriately when applying chemicals and follow all label directions. If you prefer to not use chemicals, the weed barrier will keep weed roots from reaching the soil, allowing you to pull them out with little effort.

### Windbreak Maintenance and Care

An irrigated, weed-free windbreak will provide noticeable protection within 3 to 4 years and will give effective protection within 7 to 8 years. Dry-land windbreaks will give effective protection within about 7 to 12 years, depending on soil and precipitation.

Weed control is the key to a successful windbreak, with weeds and grass growing next to seedlings as the number one cause of seedling mortality (Figure 5).



Another factor to consider in the care and maintenance of your windbreak is animal damage. Deer and elk, voles, pocket gophers, mice, and livestock can all inflict serious damage to your windbreak. Control methods include mechanical barriers such as tree shelters, fencing, or trapping, keeping the surrounding area clear of tall grasses and shrubs, and chemical controls such as chemical browse inhibitors and rodenticides. Contact your local Fish and Game office for the rules and regulations for using pesticides for animal control in your area.

### For more information.

Contact your local University of Idaho Extension or Natural Resource Conservation Service office for more information on windbreaks and tree planting.

**Table 2.** Plant material recommendations - by region and in order of preference.

dense shrubs	medium deciduous	tall deciduous	medium evergreen	tall evergreen
Wood's rose snowberry ninebark golden current oakleaf sumac western sand cherry	chokecherry serviceberry black hawthorn American plum	Idaho hybrid poplar common hackberry	Rocky Mountain juniper Austrian pine	Colorado blue spruce Norway spruce ponderosa pine Austrian pine Scots pine

This publication is issued as contribution No. 1031 of the University of Idaho Forest, Wildlife and Range Experiment Station, College of Natural Resources, University of Idaho, Moscow, ID 83844-1130.

The University of Idaho is an equal opportunity/affirmative action employer.