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Division of Resource Conservation & Forestry

## Windbreak Benefits

### Soil and Water Conservation

- ◆ Soil stabilization
- ◆ Snow deposition

### Livestock Windbreaks

- ◆ Less cold temperature stress
- ◆ Improved animal health
- ◆ Increased feed efficiency
- ◆ Improved reproduction

### Farmstead Windbreaks

- ◆ Reduced energy costs
- ◆ More efficient and safer work area
- ◆ Snowdrift management
- ◆ Recreation area
- ◆ Added value to farmstead

### Agroforestry Products

- ◆ Firewood
- ◆ Post and poles
- ◆ Fruits and nuts
- ◆ Wildlife habitat
- ◆ Animal bedding
- ◆ Landscape and garden mulch
- ◆ Christmas trees and nursery stock

## Benefits of Design

- ◆ Can use larger cultivation equipment between sets
- ◆ Shorter cultivation time with insets
- ◆ Better access to individual trees
- ◆ Flexibility in management program
- ◆ Quick and long term protection can be offered in same planting
- ◆ Easier windbreak renovation

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# Twin row - High density Windbreaks

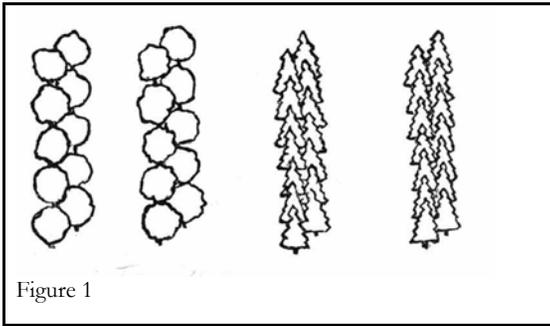


**South Dakota**  
**Department of Agriculture**  
Division of Resource Conservation  
and Forestry

Twin row – high density windbreaks are sets of individual windbreaks within a large windbreak. It is a series of sets of two closely spaced tree rows, with a wide gap between sets. It is recommended for living snow fences and farmstead windbreaks, but not for field windbreaks.

Twin row refers to two closely spaced rows of trees or shrubs. Both rows of a twin row should be the same species.

High density refers to the close spacing of trees or shrubs in each twin row. The two rows should be spaced 5 to 6 feet apart, and trees in a row are 5 to 8 feet apart. Trees should alternate in a checked pattern (figure 1).



The open space between twin rows can vary from 25 to 50 feet, and there can be one to four twin rows in a windbreak. This makes it easy to custom design a windbreak to fit your needs.

### Reasons for Design

1. Many older solid block systems are aging and dying. If you try to plant within, you do not have room. If you try to plant alongside the old windbreak, the wind patterns change effecting snow deposition.
2. Replacement of twin row – high-density windbreaks is easier: there is space to plant between the sets.
3. The space between rows in a solid block planting does not match size of cultivation equipment owned by farmer. When the farmer stops maintenance, grasses and weeds invade causing moisture stress for the trees. Tree rows are sometimes planted so far apart that the trees never achieve crown closure.
4. Twin sets close canopies in 3 to 5 years for fast

growing trees and 8 to 12 year for the slowest growing species, thus reducing needed cultivation. Weed control between sets must continue, however.

5. Windbreaks require varying degrees of management during their lifetime. The twin row – high-density design allow access to individual trees and flexibility in the management program.

### Windbreak Location

The windbreak should be located north and west of the area to be protected. The most northerly and west-erly row should be 200 to 250 feet from area to be protected. The other twin sets are then planted 25 to 50 feet apart to the south and east of the first set (figure 2).

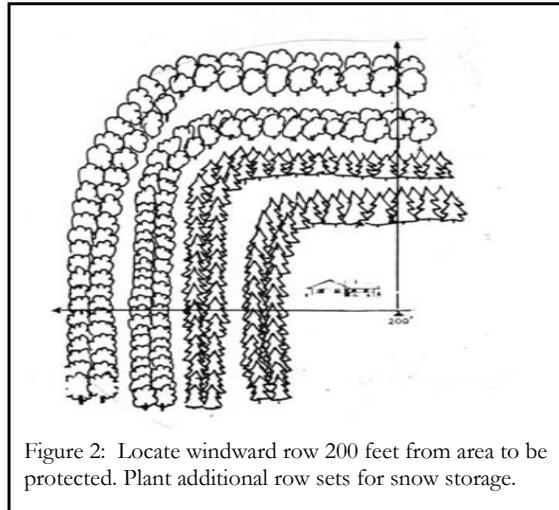


Figure 2: Locate windward row 200 feet from area to be protected. Plant additional row sets for snow storage.

### Determine Species

1. Plant dense crowned trees or tall shrubs in the first set on north or west side of planting.
2. Plant species most resistant to snow breakage (like most deciduous trees) in the second set.
3. Plant species most susceptible to snow breakage (like pine) in the most windward or leeward sets.
4. Plant tallest growing species in most leeward set to provide best downwind protection.
5. Wildlife species should be planted in third or fourth set form windward side, since the least amount of snow will accumulate in that area.
6. If planting long-lived and short-lived species in the same planting, plant the long-lived species in second and fourth sets, or first and third if only three sets are used.

### Managing the components

#### The plant component (the sets)

Weed control between sets is very important until crown closure is achieved. Once the crowns touch, weed control should not be necessary.

Replace dead trees the first two years to avoid “holes” in each windbreak wall.

#### Snow storage component

Keep the 25 to 50 foot area between the twin sets free from deep-rooted plants that might rob the trees of moisture. Area less than 25 feet wide will reduce snow storage capacity.

#### Isolation strip component

There should be at least 12 to 16 feet of space left around the perimeter of the entire planting. This space should be cultivated for life of planting for fire protection and moisture storage.

### Site preparation

Complete site preparation is necessary for good survival and effective weed control.

### Vegetation control

Weed control will be necessary in the plant component and can be done with chemicals, cultivation, or mulch.

### Plant and species composition

1. The same species should be planted in both rows of a set.
2. Include tall species with dense branches for good winter protection.
3. Employ good planting procedures for good survival. All dead material must be replaced the same or following growing season.
4. For the least amount of problems, not all sets should be of the same species.

### Design fundamentals

1. One twin row alone can offer wind protection, but it will lack snow storage.
2. The total width of the planting should not exceed 150 feet, nor be less than 75 feet.
3. Snow piling in average years will be greatest in the second set area, and least in the third and fourth sets.
4. Extend the windbreak length 75 to 100 feet beyond the area in need of protection.