Shelterbelts 101: Establishing a new windbreak
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Shelterbelts have become an important part of the American landscape. Shelterbelts have been planted to slow wind erosion, reduce home heating and cooling costs, improve homestead quality of life, defer snow from piling along structures and create ecosystems for both birds and wildlife. Establishing a new shelterbelt or windbreak takes time and patience. This article will cover planning, preparing and planting a newly established shelterbelt.

Shelterbelt planning should begin in the spring or fall of the preceding year. The first step is to determine the prevailing winds and plan the shelterbelt perpendicular to those winds. The second step is to determine how many rows of trees and shrubs you have room, money and time for. In Montana, it is common to have shelterbelt with 3-5 rows with a 20 foot row spacing between rows in order to best slow down winds. The number of rows is often based on the available space for a shelterbelt with 60 feet width required for a 3-row and 100 feet required for a 5-row design. For snow capture, there should be a minimum of 50-100 feet between the shelterbelt and the structures to avoid snow damage. Creating a fallow zone before planting seedlings will allow moisture to collect in the zone and increase the probability of seedling survivability.

In any shelterbelt across central Montana, the first row facing the wind should be a low shrub species. The next row should be an intermediate sized shrub or tree, followed by a taller tree, often an evergreen such as ponderosa pine or spruce for a 3-row and a deciduous tree for a 5-row design. In a 5-row design, the fourth row is a tall evergreen and the fifth row a dense intermediate shrub or evergreen. The reason for this configuration of sizes is to minimize the negative impacts of strong winter winds on the trees and shrubs as they can get freeze dried. Evergreen species offer the best winter protection. However, since they retain their foliage in the winter, they are the most sensitive. To help protect the evergreens, plant shrub and deciduous tree seedlings in a wedge shaped design.

Seedlings should be carefully selected so that they are able to survive drought, severe cold and rapid transitions between Chinooks and cold jet streams. Different species are available from many sources but should be selected for the genetic origin of trees and species. For example, ash trees grow as far south as Kentucky and north to Canada, but only those with a northern origin will be cold hardy for Montana. A good consistent source is the Montana Conservation Seedling Nursery run by the Montana Department of Natural Resources and Conservation. Seedlings from this nursery typically have been selected from proven seed sources for Montana. Orders can be made through the local MSU Extension office in the fall and seedlings will be delivered in the spring. There are also several commercial nurseries in the region that provide quality seedlings.

Diagramming a shelterbelt on graph paper is a great way to visually examine the shelterbelt before the work begins inorder to figure out how many seedling of each species is needed. Once preferred species have been determined for each row, the spacing between seedlings within each row needs to be determined, and this can vary greatly among species. Recommended spacing guides are available from
Preparing the shelter belt should begin with preparing the soil. Montana receives around 14-18 inches of precipitation annually so it is important to remove any competition with other plants. Chemical and mechanical fallowing can be utilized to prepare the soil. Chemical fallowing will decrease wind erosion more so than mechanical fallowing. Using a short duration herbicide is recommended however, be sure to read and follow the herbicide label.

Plant seedlings when the ground has thawed, but the delivery date may be during unfavorable planting conditions. If the ground is frozen, store the seedlings in a cool, dark location to keep them dormant. If the seedlings have been held over for a week, then lightly water them. Do not place seedlings directly into water buckets for a long period of time as their roots need oxygen to survive. Seedlings that come out of dormancy will start to grow immediately and if they are not already properly planted, they will waste precious energy growing fragile roots that will break when disturbed by planting.

Utilizing weed barrier fabric increases the chance for the seedlings to survive. When planting seedlings in weed barrier fabric, cut an X in the fabric and plant the seedling in the middle of the X. The roots should be planted so they face downward into the soil. If any part of the root system curves upwards or back on itself, that portion will die back and waste precious resources for the seedlings to establish. For larger plantings, using mechanical planters that are pulled behind a tractor are useful and often available for rent from local counties or conservation districts. Using mechanical planters requires some practice getting the roots properly into the ground and in the correct spacing.

Irrigating the seedlings is important for the first three years to help establish a healthy root system. Nursery seedlings do not have the extensive root system needed to survive a droughty environment and require time to find soil water sources. Watering during droughts is also important for a healthy shelterbelt, especially in drier areas. There are many types of irrigations systems and designs to choose from with the most popular being a drip irrigations system with emitters. Since seedlings have been grown in favorable conditions, they are very nutritious for deer and other wildlife. Fencing the seedlings from wildlife or using repellants will increase the chances of survival. Also staking the seedlings will allow them to grow strong. Stakes should be removed once the tree can sustain itself from winds.

For more information on shelterbelts, contact the MSU Cascade County Extension office at (406) 454-6980.