

FORESTRY TECHNICAL NOTE

Tillage for Weed Control in Windbreaks and Shelterbelts

Robert Logar, State Staff Forester
Joseph Scianna, Horticulturist



Introduction: Windbreaks and shelterbelts require maintenance for survival and growth. One maintenance practice is controlling competing vegetation around the woody plants in a windbreak or shelterbelt. Controlling the competing vegetation is particularly important in areas of low natural precipitation. Competing vegetation includes grasses, forbs, crops, or noxious weeds. Any plant that competes with the woody plant is undesirable and considered a weed. Tillage is an effective tool for controlling weeds. It is defined as the physical removal of the entire plant from the soil, the physical separation of the stems and shoots from the root system, or the pulverizing of the plant within the soil. This Technical Note provides information on proper tillage techniques for weed control in windbreaks and shelterbelts.

I. TECHNIQUES:

A. Scope: Control the weeds between the rows, within the rows, and outside the rows adjacent to the planting. Weed control within the row is often more difficult than between rows and may require manual rouging, specialized cultivation equipment, or the use weed fabric, mulch, chemical treatment, or a combination of treatments for optimum results.

Note: Perennial weeds with a rhizomatous or stoloniferous habit can be spread by tillage operations. In most cases, herbicides are recommended for control of these species. Frequent tillage over the growing season to stress weeds in conjunction with late summer or early fall applications of herbicide has been an effective technique of controlling perennial weeds such as bindweed *Convolvulus arvensis*.

Consider for the first three years, a narrow (3 – 5 feet) planting of cover (small grain, corn, sorghum, or tall wheat grass) between the rows to protect the young trees, reduce wind erosion, and to harvest snow

moisture. After three years complete weed control between the rows will be required. During initial establishment, the weed control around each plant is more critical.



Regular and effective weed control produces an effective and resilient windbreak

B. Frequency: Frequency of tillage depends on several factors including the portion of the planting being tilled (within- versus between row), age of the planting, the amount and type of competing vegetation, the physical characteristics of the soil, soil moisture, and other factors. Allow 2 to 3 weeks after planting to begin within-row tillage operations. New plantings (without weed fabric) require frequent within-row tillage, with the number of tillage operations decreasing as the planting becomes established. Established plantings (at least 3 to 5 years old) are typically tilled 2 to 3 times each year within- and between rows. Cultivation is most effective just after a flush of growth when weed seedlings are still small (less than 2 to 3 inches tall). Avoid excessive cultivation of soils, particularly sandy textured soils, which may lead to reductions in soil moisture, increased soil erosion, damaged soil structure, sandblasting of the tree seedling, and damage to tree seedling root systems. Tillage is ineffective if performed when weeds are not present.

C. Timing: Tillage should begin early in the growing season and repeated over the summer as flushes of weed seedlings appear. The weed seedlings should be small to be more effective. The effectiveness of tillage equipment and operations is closely correlated with soil moisture conditions. Depending on soil texture and moisture, till 2 or more days after rainfall or irrigation so that tillage equipment functions properly. Tillage equipment tends to bounce or float over clayey-textured soils that are dry, whereas dry sandy-textured soils are susceptible to wind erosion. Tillage of excessively moist clayey-textured soils results in large clod production, compaction of soils, poor weed control, and equipment plugging and damage. On irrigated ground, allow 2 to 3 days after tillage before irrigating to ensure that weeds are completely dead. If tillage is being used after herbicide treatment, make sure that enough time has elapsed for effective translocation and operation of the chemical. Cultivation of annual grasses and weeds late in the growing season is of minimal benefit to tree and shrub seedlings. Late season cultivation affects tree seedlings roots and may delay the hardening off or dormancy process.

D. Depth: Till no deeper than approximately 1 to 3 inches below the soil surface and no closer than 2 feet from the base of the tree or shrub seedling. It is important to emphasize that the tillage operations shall be **shallow** (1-3 inches) in depth. As plants mature, set backs from the main stem should increase to prevent damage to growing roots, limbs and branches. Excessive depth of cultivation results in tree root damage, increased fuel cost and equipment wear, as well as returning buried weed seeds to the soil surface where they can germinate and grow. Control weeds closer than two feet by using hand tools or by pulling.

E. Speed: It is best to operate cultivation equipment slowly – 4 to 6 miles per hour, especially in proximity to trees and shrubs during the establishment period. Excessive tractor and equipment speed causes seedling disturbance and damage.

F. Duration: Weeds are to be controlled throughout the life of the conservation practice. Controlling the competition from weeds is critical for early seedling survival and establishment. Competing vegetation reduces water and nutrient availability, thereby hindering plant growth and delaying the function of windbreaks and shelterbelts.

G. Equipment: Common within-row tillage equipment includes hand hoes, shovels, line-trimmers, and specialized rotary tillers (Weed Badger). Between-row tillage equipment includes disk harrows, cultivators or sweeps, and roto-tillers. Limit the use of roto-tillers because their frequent operation damages soil structure. When using tillage between synthetic weed control fabric, use extreme caution to avoid slicing, tearing or hooking the fabric. Adjust implement so that soil is not thrown on the fabric as plants can sprout in this soil and grow through the fabric greatly complicating future management.



Controlling weeds with in row tillage – Weed Badger

Where to get help

For more information, contact the local office of the USDA Natural Resources Conservation Service or your local Soil and Water Conservation District.

REFERENCES:

Laursen, S.B. and H.E. Hunter. 1986. Windbreaks for Montana: A landowner's guide. Bulletin 366. Cooperative Extension Service, Montana State University, Bozeman, Montana.

Stange, C., Ogle, D. and L. St John. 2002. Tree Planting, Care and Management. Technical Note Plant Materials No. 43, USDA-Natural Resources Conservation Service, Boise, Idaho.

Herman, D.E., Stange, C.M., and V.C. Quam. 1996. Editors. North Dakota Tree Handbook. North Dakota State Soil Conservation Committee, USDA-Natural Resources Conservation Service, North Dakota State University Extension Service, and Western Area Power Administration.