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PLANTING TREES

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FOR FARMSTEAD SHELTER

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AGRICULTURAL EXTENSION SERVICE
U. S. DEPARTMENT OF AGRICULTURE

A GOOD FARMSTEAD SHELTERBELT WILL . . .

- Reduce the effects of cold, piercing winter winds on humans and animals.
- Moderate the effects of hot, dry, searing summer winds.
- Beautify the home and farmstead, making them attractive places to live and work.
- Prevent snow from drifting around buildings, roads, and walks.
- Save fuel – up to 30 percent in many homes.
- Cut down feed costs. Cattle protected against winter winds use feed for weight gain and not merely to keep warm.
- Protect feedlots, gardens, and orchards.
- Aid in establishing lawn and landscape plantings.

To find out how to have a good farmstead shelterbelt, see:

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Planting Trees For Farmstead Shelter



Marvin Smith and William Miles*

A good shelterbelt or windbreak adds to the comfort and enjoyment of your farm home and farmstead. It also adds thousands of dollars to the value of your farm. A barren, exposed farmstead offers little for comfortable living and family pride. A well planned shelterbelt, however, protects livestock, provides good conditions for successful orchards and gardens, and affords wind protection for landscaping.

This bulletin tells you what factors to consider when establishing a new shelterbelt or renovating an old one. It tells how you can plan, plant, and establish this valuable asset on your own farm. The information in this bulletin is based on experience obtained in establishing shelterbelts in Agricultural Extension Service work since 1926, and on the results of research and trials in Minnesota and other states.

SHELTERBELT LOCATION

Basic Layout

For the greatest protection from prevailing north and northwest winds, plant the shelterbelt on the north and west sides of your farmstead. For the average Minnesota farm, the windbreak should:

- Run approximately 400 feet on both the north and west sides of the farmstead. It's seldom desirable to plant trees on more than two sides because some air circulation is needed for summer comfort.

- Not be closer to the house and barn than 100 feet (figure 1). Trees within 50 or 60 feet of the house cause snow to pile up around buildings and drives. An interval of 100 feet or more gives you room for gardens, orchards, sheltered feedlots, and picnic areas.

- Extend south and east at least 50 feet—preferably 100 feet—past the last main building. This distance enables you to avoid the snowdrifts which form around the ends of a treebelt and interfere with farmwork (figure 1).

- Be at least 90 feet deep and consist of eight rows of trees.

Where south winds are a problem, the west arm of the shelterbelt can curve in for about 100 feet. This curve protects against storms coming from a southerly direction.

Never surround your farmstead with trees on all four sides, as a "dead air pocket" is created in the center. As a result, trees deflect the snow upward and then drop it in the farmyard. Trees on all four sides can also make hot summer days

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unbearable by slowing down air movement.

A windbreak gives reduced wind speed for a distance of approximately 20 times the height of the tallest trees. So most of the farmstead lying within 300 to 400 feet of the shelterbelt is protected.

Highways or other obstacles can often prevent you from following this suggested standard plan. You may have to eliminate some tree rows or make adjustments.

Wind blowing across the land travels in about the same manner as water flowing over the land. You can alter the direction of either by making changes in topography or creating obstructions that deflect the flow. Dams built to slow up, retain, or retard water are designed so as to have a long concrete apron leading up to the peak or the water height desired. The pressure behind the dam causes water to spill over in a wide arch.

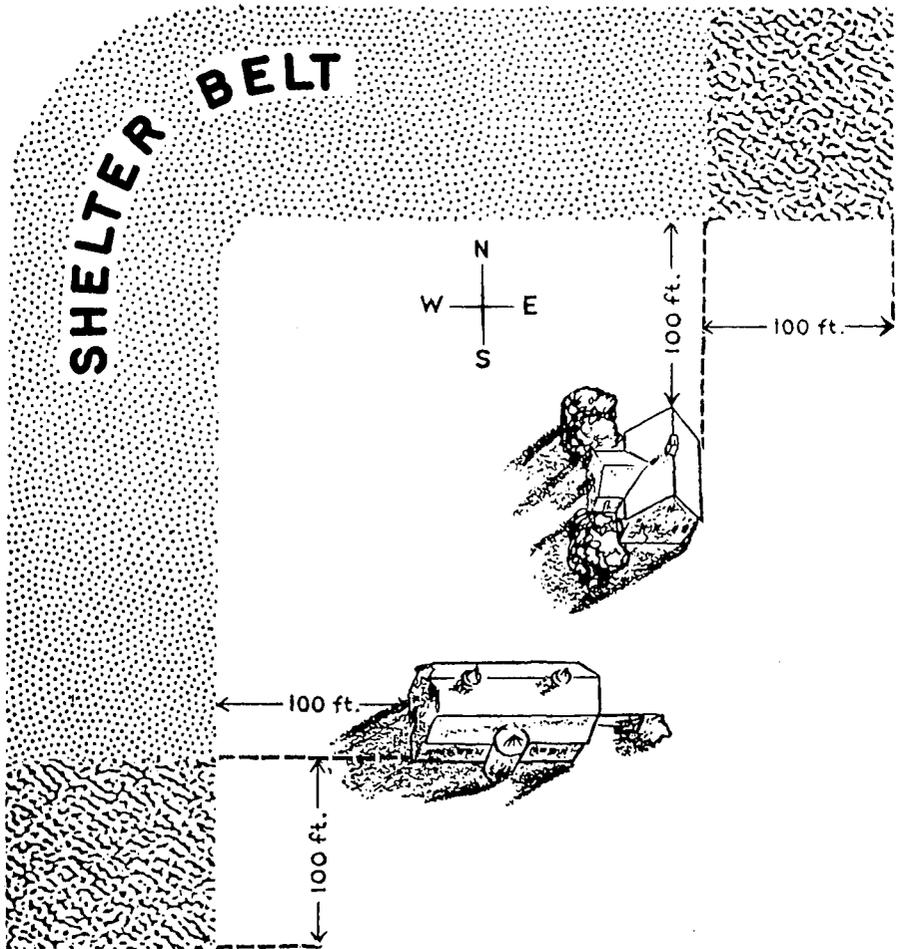


Figure 1. Basic layout of the shelterbelt. It shields the farmstead on the north and west, the directions from which most of Minnesota's stormwinds come. The inner row of trees should be at least 100 feet from all buildings. Plantings should extend 100 feet beyond the limits of the buildings for protection against winds whipping around ends of the shelterbelt (see darker areas).

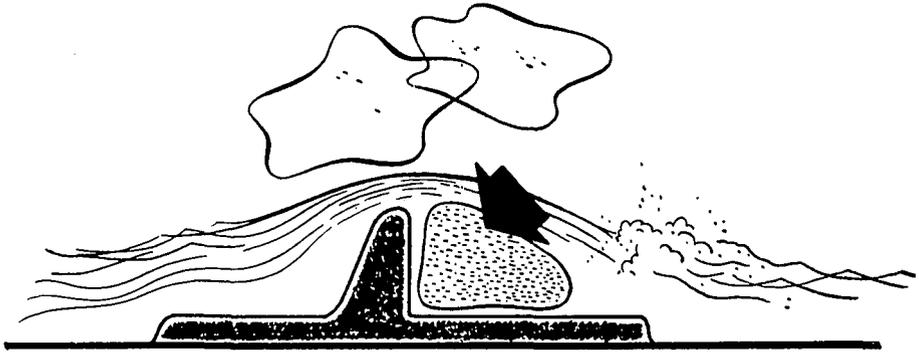


Figure 2. A shelterbelt is designed to “spill” stormwinds far over the farmstead, as a dam deflects waterflow. Shorter shrubs and trees on the outside force the main wind current upward to clear the taller trees on the inside (see figure 5). Since winds continue at that height for some distance, the farmstead lies in the sheltered area (arrow) below the “dam.”

A good shelterbelt plan is designed along the same basic lines to deflect the wind upward and “spill” it far over and beyond the farmstead (see figure 2).

Spacing

No one recommendation on the spacing interval between tree rows satisfies all requirements with respect to tree growth, cultivation, management, and available land area over the lifetime of the windbreak. In the final analysis, any recommendation is a compromise.

Close spacing: (1) provides protection earlier, (2) shortens the period required for cultivation, and (3) allows you to plant more rows on a limited area. However, these advantages are more than offset by the fact that wide spacing: (1) eliminates the necessity for thinning, (2) enables trees to retain lower branches for a much longer time, and (3) most important, allows you to use farm equipment for cultivation.

So provide an interval between tree rows which is 3 or 4 feet greater than the width of your cultivating equipment. If, for example, your field cultivator is 10 feet from wheel to wheel, space rows 13 to 14 feet apart.

One exception to this rule is the interval between a row of evergreens and an adjacent row of broad-leaved trees. In this case, normal spacing allows the faster growing hardwoods to overtop the slower growing evergreens. Instead, allow 16 to 20 feet between adjacent rows of hardwoods and evergreens.

LAND PREPARATION

No single factor assures better survival or faster growth in a new windbreak than proper preparation of the planting area during the summer before actual spring planting. Fallowing or keeping the land in a cultivated crop, such as corn or potatoes, the year before planting assures a loose, clean, pulverized soil. The soil then holds moisture well and is relatively free of competing weeds. Fallowing a full summer before planting is best.

On well prepared land, hardwood trees grow amazingly fast and begin to pay off in 5 or 6 years. By then the evergreens are growing about 8 to 12 inches per year.

Sod Ground

Do not plant trees on sod ground or in an alfalfa field without first plowing well and working down the field for 1 or

2 years before setting out trees. This process is especially necessary on heavy soil where moisture is not always sufficient during the growing season.

Plow just deep enough to turn the sod; then disk thoroughly to cut it into small pieces. During the summer, plow deeper. Fallow with a disk and spring-tooth harrow to keep down grass and weeds. Finally, let the area lie rough over the winter so as to catch snow and hold moisture for spring.

In the spring, disk and harrow the area again. The soil is now mellow, retains water well, and can be easily planted.

Sandy Ground

A thick sod layer or rank growth of competing vegetation is rarely a problem on light, sandy soils typical of east-central Minnesota. If you prepare sandy soils in the same manner as sod-covered ground, you can expect serious wind erosion and difficulties in planting. For favorable planting conditions, plow soils in the fall and plant the following spring without further working of the ground.

Other Preparation

Before planting, fence out cattle, sheep, hogs, and chickens. Animals bruise, trample, or break trees and dig up roots. Chickens peck off new growth and needles and scoop out holes at the base of trees. When trees are taller, chickens roost in them, plastering stems and branches with droppings that can kill the trees.

When fencing, allow about the same distance between the fence and trees as between tree rows. This distance allows space to cultivate and prevents cattle reaching through to nibble at trees. It also protects trees from grass fires.

SOURCES OF STOCK

Planting stock for shelterbelt, reforestation, and wildlife purposes is available from nurseries operated by the Minnesota

State Division of Lands and Forestry. This agency provides forest planting stock in lots of 500 or more seedlings and transplants for general forestry purposes, including shelterbelts and field windbreaks.

Many commercial nurseries also can supply excellent planting stock. Certain nurseries specialize in windbreak planting stock and can furnish large quantities of trees and shrubs of the size and grade best suited for this purpose.

Purchase trees from reliable sources—as close to your home as possible. Such stock is better acclimated, is more suited to your soil, can be delivered quicker early in the spring, and costs less to ship than trees from far distances.

Order enough—at least 10 percent more than is required for your planting program. You can then cull out poor, scrawny, or damaged trees. You can line out the rest of the surplus trees in the garden, care for them, and later use them as replacements if some trees fail.

Order early—in the fall or early winter, before December. This practice assures delivery in early spring.

THE STANDARD PLAN

Farmstead shelterbelts require an area approximately 90 feet wide to provide room for eight rows of trees composed of a variety of species. Plant fast growers for quick results, long-lived trees for permanency, and conifers for year-round protection. Such mixed plantings also give variety to the farmstead and beautify the landscape.

Many combinations of trees and shrubs are possible in the design. Research has demonstrated that any one combination should incorporate the following four features:

1. A dense, low-growing shrub in the windward row.
2. A tall shrub or medium-height tree inside and adjacent to the dense shrub row.
3. Four rows of tall trees including both fast-growing and long-lived species.

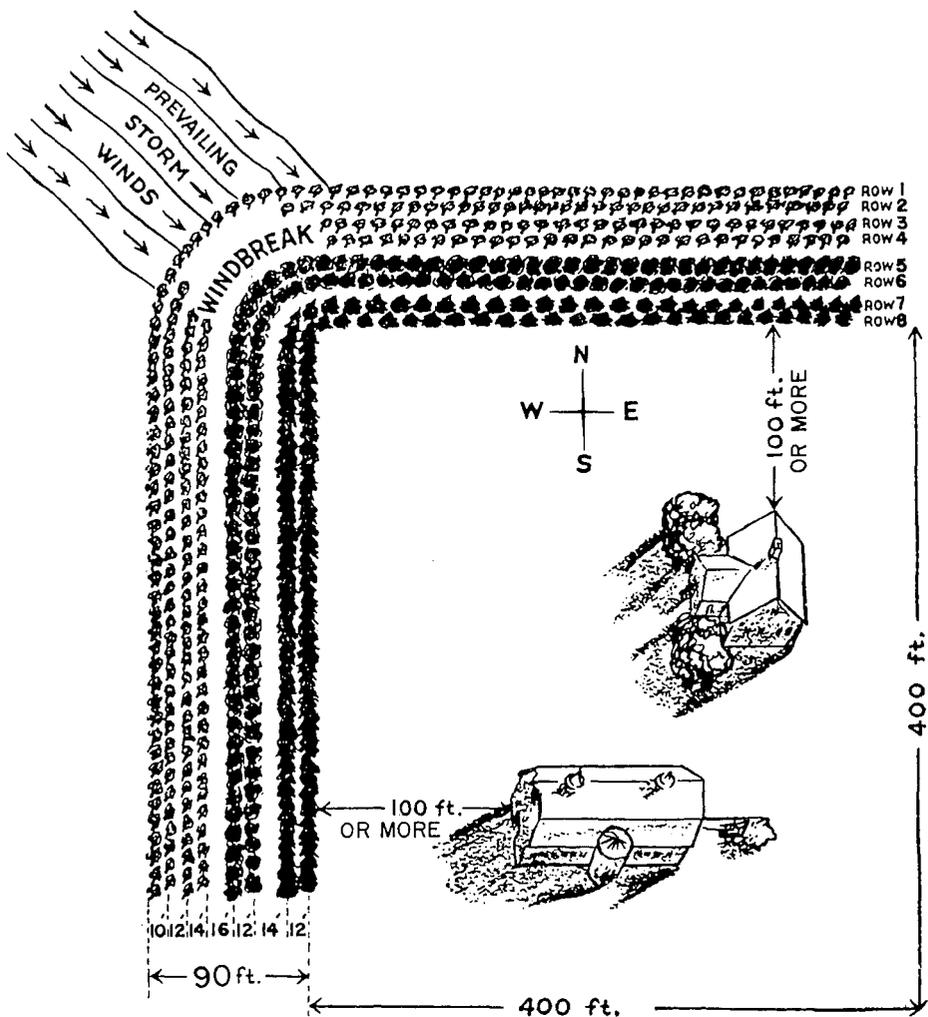


Figure 3. Standard plan. The indicated spacing between rows is only a guide. Make spacing at least 3 feet wider than the width of your cultivating equipment.

(All may be broad-leaved trees or a combination of broad-leaved and evergreen trees as shown in figure 5.)

4. Two rows of evergreen trees nearest the farmstead.

A windbreak that includes these features provides: (1) protection to ground level, (2) maximum ultimate height, (3) year-round protection, (4) rapid growth, and (5) reasonably long life.

WHAT TO PLANT

Choose trees of proven hardiness in your locality. To check on how well certain trees will do, compare them with others of the same kind that have grown successfully on similar soils in your neighborhood. Some suggestions follow. For specific recommendations, see your county agent, Soil Conservation District (SCD) farm planner, or local forester.

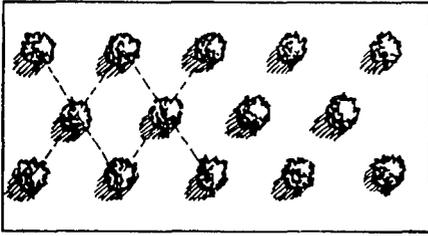


Figure 4. Proper alignment of trees—alternated or staggered.

Dense Shrubs

Plant dense shrubs 2 to 3 feet apart within the row. Choose from: Tatarian honeysuckle, White Belle, purple-osier willow, common lilac, Caragana, Amur honeysuckle, Zabels honeysuckle, and red-osier dogwood.

Tall Shrubs or Medium Height Broad-leaved Trees

Plant these trees 5 to 6 feet apart in the rows. Choose from: golden willow, laurel-leaf willow, Russian olive, American wild plum, Amur maple, boxelder, chokecherry, Siberian crab, or one of the hardy strains (Harbin, Dromore, Chinkota) of Siberian elm.

Tall Broad-Leaved or Evergreen Trees

Space trees 8 to 10 feet apart within the row. Choose from among: Broadleaves—green ash, hackberry, silver maple, American elm, native cottonwood, Siouxsland cottonwood, Robusta poplar, Norway poplar, and white willow. In south-eastern and south-central Minnesota, you might also include walnut, butternut, and hard maple. Evergreens—red (Norway) pine, Ponderosa (western yellow) pine, and white pine.

The standard windbreak consists of four rows of tall trees. These may be all broad-leaved species or you may choose to include one or two rows of pine. In the latter case, locate the pines next to the inside spruce rows. Be sure to leave a 16- to 20-foot space between the last row of broad-leaved trees and the adjacent row of pine.

Medium Height Evergreens

Plant 8 feet apart in the row. Choose from: Black Hills spruce, Colorado spruce, white spruce, Norway spruce, and white cedar.

Spruce have dense foliage and maintain their limbs close to the ground for most

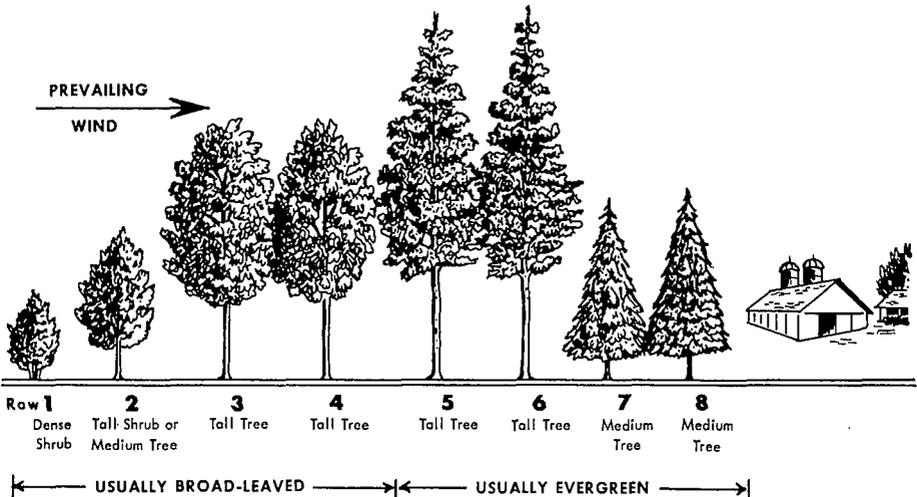


Figure 5. Profile of a standard plan eight-row windbreak.

of their life. This growth characteristic prevents dust and snowstorms from filtering through the treebelt. So spruce are the best species for the inner two rows.

Locate the spruce on the inside where your family can see them. This is one of the first steps in home and yard beautification. Spruce and pine, having foliage the year around, provide maximum winter protection and summer beauty.

If limited space prevents your planting the standard eight-row windbreak, plan to use fewer rows rather than crowding trees. For example, five rows of trees with room to grow give better results than eight overcrowded rows. If you must plant fewer than eight rows, use this guide:

If you have
room for Use one of these combinations
only: (row numbers are from figure 5):

7 rows	1, 2, 3, 4, 6, 7, 8 or 1, 2, 3, 5, 6, 7, 8
6 rows	1, 2, 3, 4, 7, 8 or 1, 2, 3, 5, 7, 8
5 rows	1, 3, 4, 7, 8 or 1, 2, 4, 7, 8
4 rows	1, 2, 7, 8 or 1, 4, 7, 8
3 rows	1, 7, 8 or 1, 3, 7

SIZE OF PLANTING STOCK

Hardwoods

Use 2-year-old hardwood seedlings, 14 to 16 inches high. This size is easiest to plant. They establish quickly, have a good root system, and cost less.

Good stock quality is necessary for success of initial establishment, survival, and growth. The first growing season is the critical period in the establishment of plantings. Healthy, well formed trees with full and branchy root systems are important.

Conifers

When ordering conifers, select transplants, not seedlings. Transplants are

trees grown from seed in a nursery for 2 years and then lifted and planted in transplant rows. They are cultivated and cared for until they develop a good root system and sturdy stems.

Transplants are referred to by the term "2-1 or 2-2 stock" or similar designation. It means that the transplants are 3 or 4 years old, having been grown 2 years in seedbeds and 1 or 2 years in transplant rows. The 2-2 conifer planting stock is usually about 10 to 14 inches high. Some nurseries describe planting stock which has been transplanted twice as "T-T" on their lists.

Evergreen transplants are especially recommended for shelterbelt plantings in southern and western Minnesota because of the less favorable environment for growing trees. Transplants compete better with grass and weeds and are easier to handle in planting—whether by hand or tree-planting machine.

Don't judge trees by the top only—the root system is just as important. Nutrients and moisture are absorbed through the roots. Big tops and small roots spell losses.

Cuttings

For some species, including the poplars, cottonwoods, and willows, the planting of cuttings gives excellent results. See page 12.

TIME TO PLANT

Spring is the best time to plant shelterbelt trees—as soon as the frost is out of the ground. Then soil is moist, climate is mild, and trees can establish themselves. The trees have a full growing season ahead and can get a good start before weeds and grass become a problem. Fall planting of forest trees is often less successful. When your trees are delivered:

1. Pick them up promptly upon notice of arrival.

2. Don't assume that the packing material around roots is moist enough. Give it a good soaking without delay. Do not



Figure 6. "Heeling-in" trees.

leave trees in the wrapped package more than 2 or 3 days because they are apt to dry out, heat, or mildew.

3. If you are not going to plant the trees for several days, put the tree bundles in cold storage (34° F. to 40° F.) or "heel-in" the trees in a trench — preferably in a cool, shady place. Make the trench deep enough and long enough to take the entire root system and a part of the lower stems.

Cut ends and one side of the trench straight, the other side sloping. Place trees in the trench side by side in thin layers, then thoroughly pack dirt around roots. Trees may be left "heeled-in" for a week or so if you do the job well (figure 6).

PLANTING

When removing trees from the heeling-in trench for actual planting, take only as many as you can carry in a pail

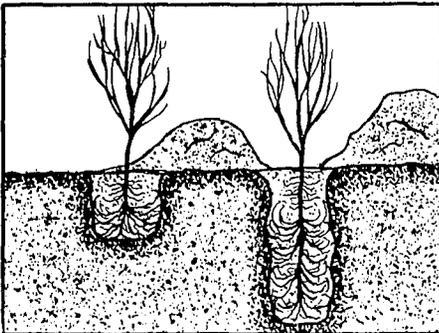


Figure 7. Left: Planting hole too shallow and too narrow. Right: Planting hole too deep and too narrow.

half full of water, or that you can plant in an hour. Recover roots of remaining trees with dirt.

Keep tree roots moist at all times, from the moment of arrival up to actual planting. Dry roots mean dead trees. During planting, handle each tree carefully so as not to skin the bark, break terminal buds, or injure roots.

Before planting, "stake out" rows. Line them up evenly and get the proper distance between them. Number rows and label stakes so you will know where each species should go. You are now ready to plant by hand or with mechanical planters.

Hand Planting

Take the trees out of the water pail one at a time but not until the hole has been freshly made. Never allow evergreen roots to become dry by being exposed to sun or wind, even for a few minutes. The delicate small rootlets of evergreens are easily injured or killed.

Use a shovel or spade in hand planting. If you prepared the soil properly, it will be loose and well pulverized and make for easy planting.

The "hole method" of planting is recommended. Make the hole deep enough and wide enough to hold the entire root system without crowding (figures 7 to 10).



Figure 8. Tree planted at proper depth with roots well spread and soil tamped down as the hole is filled.

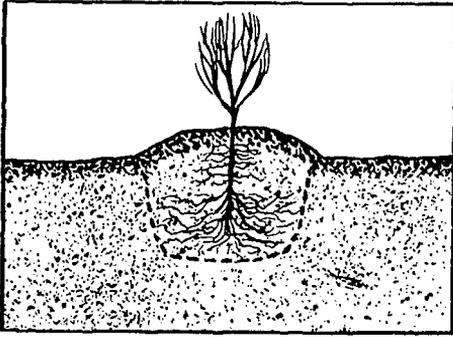


Figure 9. Dirt hilled up too high.

Hold the tree in a firm and upright position until you have tamped the soil firmly around roots (figure 10). Packing the soil thoroughly is necessary to eliminate air spaces next to roots. If you don't firm the soil, trees may die during spring or summer dry spells. It is not necessary for you to pour water into the hole after or during the planting process, particularly if the hole has been freshly dug.

Plant your trees to the same depth they grew in the ground before being dug. You can tell this by looking for the "dirt ring." The part formerly in the ground is darker than the upper stem which was aboveground. If the ground is very loose, plant an inch or so deeper in order to allow for the settling of the soil to the right depth.

Above all, do not plant the tree too shallow. Do not "hill up" earth around planted trees (figure 9).

After you plant the tree, level or slightly depress the ground so there is a small catch basin for rain (figure 10).

Mechanical Tree Planters

Mechanical tree planters are now available in most counties for farm tree-planting programs. Usually, arrangements for their use are made with the county extension agent or the SCD farm planner. In some cases, the Minnesota Division of Lands and Forestry, sportsmen's clubs, or forest industries have planters available.

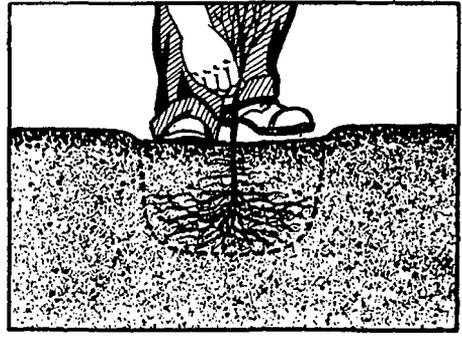


Figure 10. A good planting.

There are many kinds of tree-planting machines—light, medium, and heavy—made to suit planting conditions and terrain. Many are pulled by an ordinary farm tractor having a hydraulic lift attachment which regulates planting depth. Some machines operate independently of the tractor hydraulic system; depth of planting is controlled by mechanical devices on the tree planter itself.

Some planters have a sod-scalping attachment that turns back the sod before the slot is made for tree placement. This provides a sod-free area for trees to grow without sod competition for a few years.

Tree planters differ somewhat in detail, but they all contain these main features:

1. Coulters to cut sod and small roots.
2. Trencher to open a slot in which trees may be inserted.
3. Packing wheels to close and pack firmly the slot in which the trees are set.

With a mechanical planter, you can plant trees more rapidly, uniformly, and with less effort than with other methods—as many as 1,000 trees per hour, depending upon length of rows, terrain, and type of planting stock. Spacing of trees during the planting operation is done by the men riding the planter who merely time themselves to tractor speed. They set the trees into the slot formed as the machine goes down the planting rows (figure 11).



Figure 11. Planting with a mechanical tree planter.

Tubs or other receptacles to hold trees are part of the tree planter equipment. Place water in these tubs to keep roots from drying.

CUTTINGS

Cuttings are pieces of branchwood taken from healthy trees, especially poplars, willows, and cottonwoods. Properly cut and planted, these stem cuttings develop and grow into trees. Cuttings may be made either in the fall when trees are dormant and kept in moist sand in a cool place over winter, or in early spring before March 15 while trees are dormant.

Cuttings 12 to 16 inches long and one-fourth to one-half inch in diameter establish themselves readily. Make cuttings from the young (1- or 2-year-old) wood and well developed portions of healthy tree branches.

To plant cuttings:

1. Soak cuttings in water for at least 24 hours before planting.
2. Make a slot with a spade or machine and carefully insert the cutting. Do not push cuttings into the soil. This practice damages bark and peels it back, killing the cambium layer beneath.

Another method is to plow a furrow, lay the cutting in the furrow, and plow the earth back on the cutting to the proper depth. Tamp the earth on the low end to force it into close contact with the future root system.

3. Plant cuttings at an angle of 45 to 60° but placed so that the buds point upward. Leave only two good buds above-ground (figure 12). This process is essential for establishing a strong, well developed root system and good top growth.

Planting cuttings in a slanting position keeps the low portion in close contact with the soil, even after the ground settles slightly. If cuttings are planted straight up, the soil often settles away from them in dry periods (figure 13).

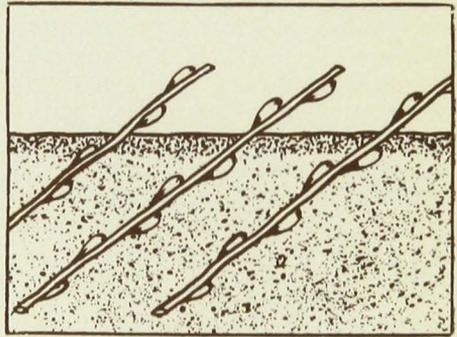


Figure 12. Planting at a 45° angle brings soil in close contact with cuttings.

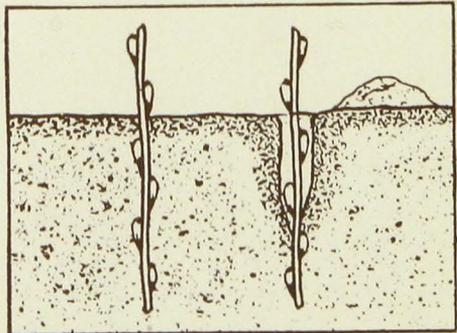


Figure 13. If cuttings are planted vertically, the ground settles away from them.

After planting, tamp the soil firmly around the low end. Properly planted cuttings grow 2 to 4 feet in 1 favorable year if kept free of weeds or grass. Rooted cuttings give better results than nonrooted cuttings.

RENEW OLD GROVES

Old farm groves established many years ago without much thought to arrangement or good planning have now lost most of their usefulness and protective effectiveness. Old age, disease, insects, storms, grazing cattle, and general neglect have taken their toll.

Often you can renew or strengthen sparse or open groves by adding new rows of trees and shrubs on the inside or outside as space permits. If, however, there isn't enough space between the present grove and the house, cut down a row or more on the inside of the old grove. Then replant with proper trees.

Many farm groves have openings due to tree losses. Dust and snowstorms then "funnel through," just as when you have a broken window or an open door in a house. Shut this opening with tree replacements.

INSECTS, DISEASES, AND RODENTS

Watch for symptoms of insects and diseases and losses caused by field mice, pocket gophers, and rabbits. These factors can cause heavy mortality.

Insect and disease control depends upon early discovery and recognition. For help in diagnosing tree problems, consult your county agent, SCD farm planner, or local state forester.

Rabbits girdle trees, chew off tops, and clip side branches of hardwoods and conifers. Watch for rabbit damage every year. Rabbits are most active in late fall, winter, and early spring when other foods are less available. Improved rabbit repellents give effective control, but good results are also obtained by "boy, dog, and gun."

Field mice also damage and girdle trees. Trash, dead grass, and high weeds



Figure 14. Rodent damage can be costly. Pocket gophers killed this healthy young evergreen by gnawing off the roots below the ground.

invite rodents to set up "housekeeping." Keep the planted area weed free. Scattering poisoned grain in the planted area is effective—if farm flocks or wild birds do not have access to the area.

Pocket gophers may kill well established hardwoods and conifers. Losses are especially high in spring and fall when they gnaw off the roots. Aboveground symptoms are dried, pale-green foliage and trees leaning vertically to one side. The tree is easily pulled out because the roots are gone (figure 14).

For suggestions on controlling gophers, see Fish and Wildlife Leaflet 307, *Controlling Pocket Gophers*. Copies are available at your local county extension office or the Department of Entomology, Fisheries, and Wildlife, University of Minnesota, St. Paul, Minnesota 55101.

CARE AFTER PLANTING

Mechanical Cultivation

Frequent timely cultivation during the growing season conserves soil moisture, helping to carry trees through late summer dry periods. A duckfoot cultivator is one of the best tools for cultivating a young plantation. Cultivate shallowly and not too close to the trees to avoid cutting

off or pulling out small roots immediately below the surface.

A section of a spring-tooth harrow is also a good tool. Disk cultivators are not recommended; they ridge up the soil around the trees which encourages rain-fall run-off.

Do not "hill up" dirt around the trees, especially around evergreens. Roots of trees need air. Piling dirt high encourages the growth of an extra set of surface roots, causing the lower and more important roots to cease functioning.

Interplant Crops

During the first few years when the trees are small, you may drill corn or some other cultivated crop between rows. After the corn is picked, leave the standing cornstalks over winter. They help catch and hold snow around the trees, reducing the danger of winterkilling and frost-heaving action.

The Time to Cultivate

Cultivation after the last part of August is unnecessary. Late cultivation stimulates growth in the fall when the trees should be getting ready to harden up for winter. Pull late weeds or let them stand over winter. Tall weeds help to catch a blanket of snow, offering additional winter protection.

Continue cultivation for several years to control weeds until trees are large enough to shade and protect the ground. Otherwise, grass and weeds reinvade the windbreak and cause stunting and even death of some trees.

Chemical Weed Control

The development of new, selective, chemical herbicides now affords another effective method for controlling weeds and grasses in windbreaks. These materials relieve the farm operator of much of the time-consuming job of mechanical cultivation.

Simazine—is a preemergent weed killer that controls most grasses and broad-leaved weeds. It is safe to use around most tree and shrub species planted for shelterbelt purposes. It is not recommended on any species of poplar, cottonwood, and willow.

Apply simazine before weeds emerge. In established plantings, apply the chemical in late fall or early spring for maintenance weed control. In new plantings on clean-tilled ground, make applications during or after tree planting—before weeds emerge.

Treatment may be a band or broadcast application. Center bands over the tree in 4-foot widths. If you use narrower bands, tall weeds will fall across the treated strip and cover the trees.

A per-acre rate of 4 pounds active ingredient of either simazine 80W or 4G (equivalent to 5 pounds of the wettable powder and 100 pounds of the granular as purchased) is recommended on fine-textured soils and soils with a high organic matter content. On coarse sandy soils, apply 2 pounds active ingredient per acre (equivalent to 2½ pounds of the wettable powder and 50 pounds of the granules as purchased). *These are rates for ground area actually treated!*

Do not use simazine more than once a year. It is not recommended on trees under 3 years of age (or less than 3-0 stock).

Amizine—is a combination of a post-emergent herbicide and simazine. This combination is particularly effective in cleaning up shelterbelts which are overgrown with weeds and grasses.

Apply amizine on growing weeds in the early part of the growing season or before weeds have matured and gone to seed. Unlike simazine, do not spray amizine on any tree foliage. Use a directed spray to prevent contact with the leaves and needles of your windbreak trees.

A recommended rate for amizine in tree plantings is 7 pounds of actual material as purchased in 100 gallons of water per acre of area treated.

The usual method of applying amizine is to make band applications between tree rows. You can apply it with a boom spray with nozzles 4 to 6 inches aboveground designed to cover a 4-foot swath up to the tree bases. Use a low-pressure, cone-shaped, coarse spray directed away from tree foliage.

Sunscald

Small evergreens are often injured by severe sunscald or hot, searing, dry winds. Placing a shingle or board 1 foot or more from these small trees on the south or west side reduces hot sun losses. Don't cover trees with burlap, paper, or old sacks; such covering only results in additional loss.

Avoid Mulching

Mulching is not generally recommended as an effective substitute for timely cultivation in the newly established shelterbelt. Use a mulch only if the land is too steep and it would be unwise to cultivate. The fine dirt mulch obtained by periodic tillage is preferred in new shelterbelts.

Whether you use clean straw, cobs, hay, or wood waste for a mulch, you make an attractive home for mice and rabbits. This is another reason for not using a mulch, especially in the winter when rodents feed on tree bark and girdle many trees.

Applications of well rotted barnyard manure can be beneficial to young trees—not only from the fertility standpoint but also for loosening heavy, compact soils which are hard to work. Do not use fresh manure; the ammonia in it injures tender roots.

Water When Necessary

Watering may be necessary, especially during droughts. If watering is done, give the trees a good soaking once or twice a week. However, too frequent watering only encourages rooting near the surface.

Keeping topsoil loose by shallow surface cultivation prevents soil cracking and reduces moisture losses from evaporation.

Do Not Prune

Don't prune shelterbelt trees. Density of leaf surface and the number of stems in the grove are factors in wind protection efficiency. The denser the planting, the better is the protection. Remember, you are seeking an impenetrable storm barrier. Pruning trees makes a sieve for the snow and wind to filter through. Severe pruning lets light in on the ground which encourages a growth of grass and weeds, allowing surface soil to dry out.

An exception is pruning to correct growth deformities or to remove damaged limbs or limbs that may interfere with other trees. For example, a spruce, pine, or hardwood tree may send up more than one leader. Select the best terminal and cut back the rest.

If trees become crowded, thin out individual trees. Pruning and thinning are problems to be considered only after a number of years when health, efficiency, and growth are established.

CONCLUSIONS

- A good farmstead shelterbelt contributes to your home's comfort, your farm's value, home beautification, livestock feed savings, and the protection of orchards and gardens. It provides a living, growing "overcoat" around the home in winter.

- Thorough ground preparation before planting assures good survival and sustained growth.

- Proper location of a shelterbelt in relation to prevailing stormwinds is of utmost importance. Usually, it should be located on the north and west sides of the farmstead.

- Selecting trees and shrubs that are of proven hardiness and suited to the soil, climate, and purpose is always essential.

● Proper spacing of trees within and between rows helps provide early benefits and long windbreak life

● Regular cultivation of trees during the growing season to eliminate weeds and grass and to conserve moisture is a "must."

● Protection of your windbreak from

livestock, rabbits, and other rodents is necessary.

● Early recognition of insect and disease damage, with proper steps taken for control, pays dividends.

● Renovation of deteriorating, over-age groves is a growing need on many Minnesota farms.



IF YOU ARE BUILDING . . .

If you are considering rearranging buildings on your farm, plan your shelterbelt at the same time. You should have your planting plans and soil prepared the summer before actual spring tree-planting time.

Consider the best location for new buildings in relation to: drainage, prevailing winds, and soil factors; grouping in relation to other permanent buildings; and field arrangement, feedlots, pastures, gardens, orchards, or a future outdoor recreation area.

Your planting plans should aim at protecting the whole farmstead and not just parts of it. Buildings located too close to main highways or other roads, or poorly located in relation to other buildings, reduce opportunities for designing a fully effective shelterbelt.

Plant trees even before you build; it takes longer to grow trees than to put up buildings.



Mention of trade names in this publication does not imply endorsement nor does failure to mention a name imply criticism by the Minnesota Agricultural Extension Service.

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