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# 4H

# FORESTRY PROJECT



UNIVERSITY OF MINNESOTA  
*Agricultural Extension Service*  
U. S. DEPARTMENT OF AGRICULTURE



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## Projects

Forestry club members may select one or more of the following projects:

1. Prepare, plant, and care for a 4'x6' seedbed.
2. Establish and care for a transplant bed of conifers—1,000 trees.
3. Plant nuts for a nut tree plantation—100 seed spots.
4. Plant and care for 100 trees as a woodlot, windbreak, or shelterbelt.
5. Plant and maintain 100 trees and shrubs for wildlife cover and food.

Some of the older members may want a more advanced project. They could undertake one of the following:

6. Plant and maintain 300 forest trees for woodlot, windbreak, or shelterbelt.
7. Plant and maintain one-fourth acre of Christmas trees, 4'x4' planting—680 trees.

# 4-H Forestry Project

Clemens Kaufman and Parker Anderson

**F**OUR-H CLUB MEMBERS can do much toward making farm homes more comfortable and attractive. Trees and shrubs add to the beauty of the home. They make the farmstead a part of the landscape. Tree windbreaks shelter the home and lots and keep the yard free of drifted snow. They protect growing crops and prevent loss of fertile topsoil by wind erosion. Farm groves and woodlots are a source of posts, fuel, and lumber for farm repairs. Gullies and ravines will heal after they are protected by a cover of trees and shrubbery. Such nontillable land with no cropping use often will produce an income if planted to trees. Small animals and birds are attracted to a protected farmstead; many song birds would not come to the farm at all if they did not have the nesting place and shelter offered by trees planted about the farm buildings.

No large piece of work is needed at any one time. Every small contribution is worth-while. A tree or two about the home, several bushes in a fence corner for game shelter, or a group of trees and shrubs in a gully to stop erosion may be all that can be done in one year; but this alone is a very fine beginning. Growing trees and shrubs is just as simple as growing a stand of corn and much more fun, for each succeeding year the trees are bigger and more beautiful than they were the previous year.



FIG. 1. MANY 4-H GROUPS LIKE THIS ONE TAKE PART IN 4-H FORESTRY PROJECTS

## Collecting and Storing Seed

**N**ATURE HAS provided trees with various devices for scattering seed. Willow and cottonwood have a plume or parachute attached to the small light seed. This makes the seed very buoyant and the wind carries it for long distances. Birch, alder, elm, maple, ash, and the conifers have a wing on the seed which causes it to whirl around as it descends from the tree. This whirling motion slows the seed's rate of fall and it is blown some distance by the wind. Ash and maple may travel only 30 to 50 feet from the tree while some of the conifers, especially from tall trees, are blown several hundred yards. Cherries, plums, red cedar, and hackberry have a fleshy coating over the seed which is greatly relished by birds for food.

Other seeds are carried about by animals. Squirrels gather the nuts of oak, walnut, hickory, hazel, butternut, and unopened cones of the conifers. This horde is stored away in various places and often forgotten or not required, with the result that the seeds

sprout the following spring. Birch, elm, maple, cottonwood, and willow are carried about by water if the trees grow close enough to a stream for the seeds to drop on the surface of the water.

The seeds of most of our Minnesota trees ripen in the late summer or fall. Exceptions are elm, soft maple, red birch, cottonwood, and willow. These species flower in April and the seed ripens in June.

Collecting elm and maple seed presents no problem for they fall to the ground when ripe and can be swept or raked up. Elm seed is blown into windrows in gutters or sheltered corners where wind eddies form. Enough seed to plant a 4' x 6' seedbed can often be gathered in a few minutes. Soft maple is not blown about as readily but collects near the parent tree and can be raked up. Middle-aged, vigorous trees, with large spreading tops, usually produce the largest amount of plump, fertile seed.

These seeds which ripen in the spring retain the ability to sprout and grow for only three to four weeks after they are ripe. For this reason they should be planted as soon as possible after they have been gathered.

Large seeds such as nuts can be gathered after they drop to the ground, but the seed from trees with small fruits must be gathered from the tree. The seeds can be reached by climbing the tree, or they can be cut from the tree by an iron hook sharpened on the inner edge and fastened to a long pole.

Ash, basswood, birches, cherries, hackberry, locust, Kentucky coffee tree, hard maple, and nuts of all kinds ripen in late summer and should be stored for planting the following year. Bury-



FIG. 2.  
TREE  
SEEDS



ing in layers in damp sand is the best means of storage for if the seeds become very dry the number that sprout is greatly reduced. Nuts can be readily stored by sacking in a burlap bag and burying the whole in damp, well-drained soil. Enough nuts may be put in the sack to make about a 4-inch layer when flattened out.

Evergreen seeds are ripe in the fall. Spruce, white cedar, and tamarack cones open while still on the tree and the seeds drop out. For this reason the cones must be gathered shortly after the seeds ripen in September. When ripe the kernel of the seed loses its soft, milky quality and becomes firm and the outer coat turns brown.

Red and white pine will also lose seeds from ripe cones in the tree, but squirrels generally cut the cones down so they can be gathered. Jack pine cones, too, can be gathered after squirrels have cut them down.

The cones of conifers will usually open if left in a dry, sunny place such as the south side of a building. After the cones have opened, the seeds can be shaken out. Jack pine cones, however, must be heated to 130° F. for about 12 hours before the cones will open.

After evergreen seed has been extracted from the cones, it should be stored in a cool, dry place for spring planting.

Considerable trouble is experienced in growing conifers from seed. Better results can usually be obtained by buying two-year-old seedlings (2-0 stock) which can be planted in a transplant bed for two or three years until it is large enough to move into the permanent location.

## *The Seedbed and Transplant Bed*

**T**HE TECHNIC for location, tillage, and protection is the same for both the seedbed and transplant bed. Careful location is important. If possible, heavy soil should be avoided. A nearby supply of water is very helpful. The beds should be near the house in order that frequent inspections can be made to determine the need for watering, weeding, or other care. Although good surface drainage is essential, steep land should be avoided. If possible, the beds should be in a sheltered area, for young seedlings and transplants need protection from high winds. Avoid soddy soil or soil containing stones, trash, or the like.

Thoroughly work the soil to a depth of 8 inches with spade and rake. If well-rotted manure is available, spread several inches over the soil before spading it. Spading may be done in the fall or spring. The soil will mellow during the winter if it is spaded in the fall. Just before planting, pulverize the bed and smooth and pack it down.

The beds must be protected from



FIG. 2.  
TREE  
SEEDS

GREEN  
ASH



WHITE  
OAK



BASSWOOD



BLACK  
WALNUT



CHOK  
CHERRY





FIG. 3. LOCATE SEEDBED IN THE GARDEN OR NEAR THE FARMYARD WHERE IT CAN BE CONVENIENTLY TENDED, WELL PROTECTED, AND WATERED IF TOO DRY

poultry, livestock, squirrels, mice or other sources of danger. Fences may be needed, and in many cases the beds may have to be protected by screens.

Keep the beds free of weeds and the topsoil loose and mellow. Water when the soil becomes too dry for proper growth. Be careful not to wash out the young plants by too heavy watering in one spot. Early morning or evening is preferred to the hot part of the day for watering unless a sprinkler is used. In that case, watering may be done any time.

### SEEDBED

The first thing to be sure of when planning to plant a seedbed is a supply of seed of the desired kind. Collecting seed personally is desirable, for home-grown seeds are well adapted to local soil and climatic conditions and there is no question as to the freshness of the seed. Seeds can be obtained from reliable seed dealers and sometimes from

persons in the community who make a business of collecting seeds.

Only ripe, fertile, plump seeds will produce strong, healthy seedlings. Untested seed can be checked for quality and purity by cutting a number open with a knife. If the kernel fills the seed coat, has a good color, is firm, and has a healthy odor, the quality of the seed is good; but a large percentage of wormy, wrinkled, light, moldy, or rancid smelling seeds in the lot indicate that germination will be low and more seed must be planted than if most of them were fertile.

The size of the bed will depend on the number of seedlings needed. The aim should be to raise about 75 evergreen seedlings per square foot of bed. For broad-leaved trees, the number per square foot should be about 50 seedlings. Standard beds are 4 feet wide and 6 or 12 feet long. If the beds are wider than 4 feet, weeding is rather difficult because tramping in the beds should be avoided.

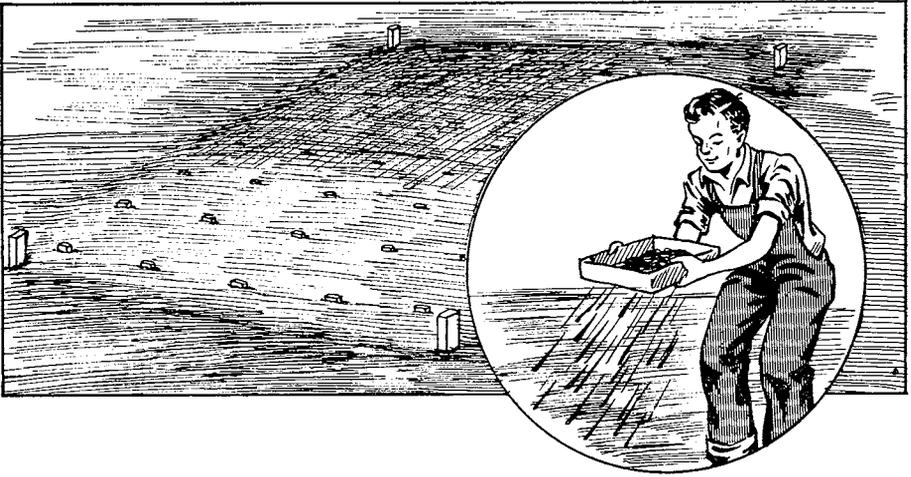


FIG. 4. FOR GOOD GERMINATION AND GROWTH COVER THE SEEDS CAREFULLY AND EVENLY TO THE PROPER DEPTH

The bed should be measured out and stakes driven at the corners. The surface of the beds should not be raised above the surrounding soil unless drainage is poor. When the bed must be raised, a curbing of 1" x 4" lumber should be built around it. The sides of the curbing will prevent the soil from washing off the surface of the bed.

### Seeding

Best results are usually obtained by early spring seeding. But where the danger of having squirrels and mice destroy the seed is not great, seeding of white pine and hardwood tree seeds may well be done in fall after the danger of warm weather is over. White pine is usually rather slow in germinating, and fall seeding of deciduous trees removes the storage problem. Seeds ripening before midsummer should be sown immediately.

The seed may be broadcast or drilled. Broadcasting is more satisfactory for evergreens and the small-seeded, broad-leaved trees. Drilling is used for large-seeded varieties such as oak, hickory,

walnut, ash, and maple. In very heavy soil, drilling is preferred for all species because the bed is easier to cultivate. Such soils must be continually cultivated to permit air and moisture to enter.

Broadcast seeding requires that the seed be evenly and carefully distributed over the seedbed by hand. It is advisable to mark the seedbed off in 1- or 2-foot squares and then seed each square as a unit. More even distribution can be obtained in this way. Try to do the seeding on a quiet day or do the work in the morning or evening when the wind is not very strong. This is especially necessary if the seed is light.

After the seed has been broadcast, press it into the ground with a flat board and cover it with one-fourth inch of clean fine sandy soil. Seed of broad-leaved trees should be covered to a depth of one-half inch. The soil can be evenly distributed by sifting it over the bed with a homemade sieve having quarter-inch mesh. Wooden pegs may be set in the soil and allowed to stick out the depth to which the seed is to be covered. When soil has evenly cov-

**Table 1. The Amount of Seed of the Various Varieties to Use in Broadcast Seeding for a Stand of 75 Evergreen Seedlings or 50 Broad-leaved Seedlings Per Square Foot of Seedbed**

Evergreens	Oz. of Seed Per 24 Sq. Ft. of Seedbed	Broad-leaved Trees	Seeds Per Sq. Ft. of Seedbed
Jack pine .....	1	Green ash .....	100
Red pine .....	1	Basswood .....	70
White pine .....	2	Black cherry .....	65
Western yellow pine .....	5	White elm .....	70
Colorado spruce .....	$\frac{3}{4}$	Hackberry .....	60
White spruce .....	$1\frac{1}{2}$	Black locust .....	60
White cedar .....	1	Honey locust .....	70
		Sugar maple .....	85
		Soft maple .....	65

ered the pegs, the seed is at the proper depth.

The soil used to cover the seed should not be too wet for it will stick in the sieve. Sandy soil is preferred as a covering for it does not crack when dry as heavier soil will. In sandy soil the seed should be covered with soil taken from 1 to  $1\frac{1}{2}$  feet below the surface. Such soil is fairly free from surface diseases and weed seeds.

Large-seeded broad-leaved trees are drilled in rows 6 to 12 inches apart. Nuts are planted in furrows 2 to 3 inches deep at the rate of six to ten nuts per foot. Smaller seeds, such as those of maple and ash, are sown one-

half inch deep at the rate of 20 to 25 per foot of row.

The quantity of seed to be used depends upon the species to be grown and the length of time the seedlings are to be left in the seedbed. Too dense a stand produces small, weak seedlings. Old infertile seed should be sown thicker than fresh seed for more of the fresh seed will germinate. See table 1 for amount of fresh seed to use.

### Care of the Seedbed

After the seeds have been sown the seedbed should be covered with burlap. A gunny sack can be ripped open

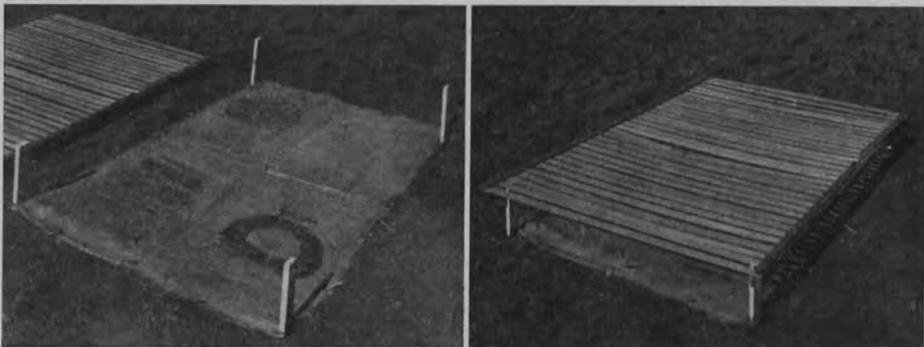


FIG. 5. (Left) TWO GUNNY SACKS RIPPED OPEN AND PEGGED DOWN OVER THE SEEDBED PROVIDE A SATISFACTORY MULCH

(Right) SHADE FOR YOUNG EVERGREENS BUILT FROM LATHS

at the seam and used. The bed should be completely covered and the edges of the burlap staked down with wire pegs to prevent it from being blown off. The purpose of this covering is to keep moisture in the bed until the seeds sprout. Water the bed well and keep it moist by sprinkling right on the burlap. After germination has started the burlap should be removed. If this is not done, the seedlings will be deformed or choked off. If burlap is not available, brush, leaves, or straw may be used.

For the first summer, coniferous seedlings are tender and liable to serious injury from the sun. The best means of protecting them from injury is by shading them with brush or a lath frame. For a lath frame, drive 2" x 2" stakes at each corner of the bed so their top is about 12 inches from the bed. Connect the tops of these stakes

with 1" x 2" boards. Over the boards place a section of snow fence or corn cribbing. If neither of these are available, make a frame as long and wide as the seedbed out of 1" x 2" boards. Nail laths 1½ inches apart over this frame. Place the frame over the stakes but do not nail it down for it must be removed to weed the bed. Brush may be used in place of the laths. The seedbeds should be given about half shade.

Broad-leaved trees may usually be transplanted after one year of growth, but evergreen seedlings should remain in the seedbed for two years before transplanting.

### THE TRANSPLANT BED

Seedling evergreens have very few branched, fibrous roots, which makes them difficult to move to the permanent location without considerable loss. But

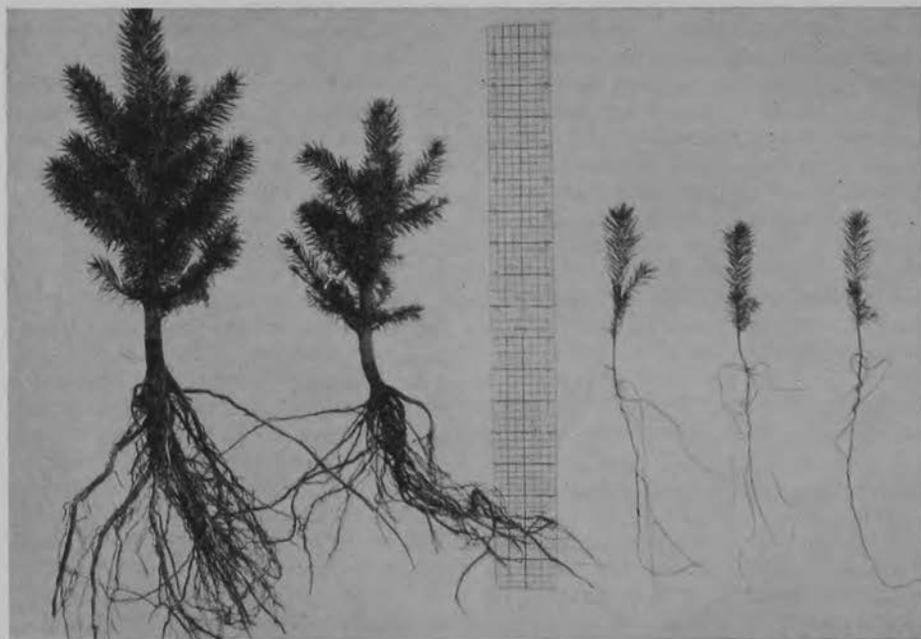


FIG. 6. COLORADO SPRUCE SEEDLINGS.—(Left) FOUR-YEAR-OLD (2-2) TRANSPLANTS; (Right) TWO-YEAR-OLD (2-0) SEEDLINGS. AFTER TWO YEARS IN THE TRANSPLANT BED THE TREES ARE MUCH BETTER ROOTED AND STURDIER THAN THEY WERE AS SEEDLINGS.



FIG. 7. REMOVE SEEDLINGS CAREFULLY FROM THE GROUND SO THAT THE ROOTS ARE UNDAMAGED

by replanting the seedlings into a transplant bed for two more years, the growth of the top is retarded and the root system becomes much more branchy with a greater number of short fibrous roots. This reduces the chances for loss when the trees are moved to the permanent location.

The seedlings may be obtained in two ways, either by raising them or by buying them as 2-0 seedlings from a nursery. The latter method usually proves more satisfactory, for raising evergreens from seed is difficult.

Transplants are usually spaced 3 to 4 inches apart in rows 6 to 12 inches apart. For 1,000 seedlings, with 6 inches between rows and 3 inches between trees, a 4 x 32-foot bed is required.

### Transplant in Early Spring

Early spring is the best season for transplanting. After the bed has been prepared, water the soil thoroughly. It is then ready to be planted.

If the seedlings are to be moved from a seedbed, be very careful to remove them without breaking the roots unnecessarily. After the soil has been

dug away from the side of the bed to a depth of 10 inches, a spade can be shoved under the seedlings in a horizontal position 7 or 8 inches below the surface. This will cut the roots and the seedlings can be removed from the soil by grasping the tops firmly with one hand, passing the other under the roots where the spade was inserted, and gently shaking off the soil.

### Keep Young Roots Moist

Never permit the tender young roots to become dry. On hot, windy days only a few minutes of exposure will harm the roots enough to cause the death of the tree. For this reason transplanting should be done on a cool, cloudy day, or the seedlings may be dug early in the morning or in the afternoon after the hot part of the day and immediately placed in damp moss, damp cloth, or in a pail partially filled with water. The roots should be protected in this manner until the seedling is actually being planted in the transplant bed.

A square-edged spade is a very handy tool for transplanting. The operation



FIG. 8. THE TRANSPLANTING BOARD SERVES AS A GUIDE FOR DIGGING A STRAIGHT TRENCH AS WELL AS FOR PLANTING THE TREES

can be further simplified by a transplant board. This is a 1" x 6" x 4' board with notches for holding seedlings every 3 inches. Instead of notches, shingle nails may be driven into the board close enough together so the seedling will not slip out. Place the board flat on the ground across the bed and dig a trench 8 inches deep along the smooth edge of the board, keeping the edge of the trench along the board smooth and vertical and piling the dirt just in front of the trench. Now reverse the board so the notched side extends slightly over the trench. Hang a seedling in each notch of the board so its roots hang down over the straight side of the trench. After the board is filled, bring the dirt back into the trench and pack it thoroughly against the roots of the seedlings. After the dirt has been packed, remove the transplant board, and proceed with the planting of the next row. A 1" x 6" x 10" board will be very helpful in filling in the trench and packing the soil against the roots.

Thoroughly water the transplant bed after the planting is done. All through

the growing season water the seedlings whenever the bed becomes dry.

Some of the pines may be moved out of the transplant bed to the permanent location after one year. In most cases, however, and especially in the case of spruce, two years should be allowed before the plants are moved. At times it is advisable to transplant the trees a second time before setting them out permanently.

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### *Nut Tree Planting*

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**N**UT TREES like black walnut, butternut, white oak, red oak, and shagbark hickory produce the most valuable natural woods in Minnesota. The trees are easily started, grow fairly fast, and will become a growing bank account for the future and a decided land asset.

For best results, trees should not be planted out of their natural range. The ranges for the more valuable nut trees are shown in figure 9.

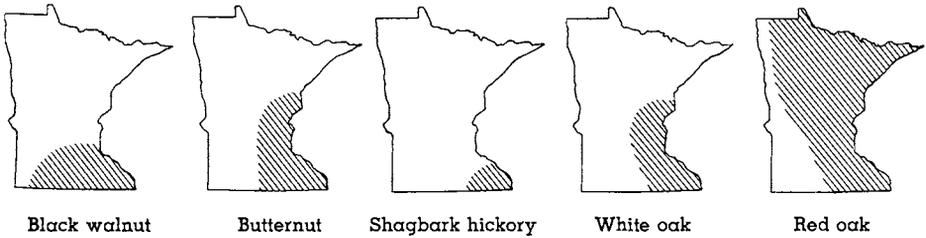


FIG. 9. PLANTING RANGES FOR NUT TREES IN MINNESOTA

Nut trees will grow on all soils that are fertile and moist but well-drained. These trees grow well on land adjoining streams which occasionally overflow. They should not, however, be planted on sour clay soils, except for white oak, which does best on well-drained, acid soils. Nut trees will grow well if planted as single trees or in fairly dense stands.

For planting purposes, choose nuts produced by strong, healthy, well-formed, fairly rapid growing trees. Select nuts that are large, thin shelled, healthy, and plump.

Acorns should be planted in the fall after they are ripe. Nuts of other trees may be planted either in the fall when ripe or carefully stored over winter and planted in the early spring. Fall planting for walnut, butternut, and hickory ordinarily is best where danger of damage by squirrels is not great. The nuts may be either planted directly in the permanent location or in the garden and moved to the permanent location when they become year-old seedlings.

## PLANTING AND CARE

1. Planting nuts in the permanent location.—
  - a. Make seed spot for planting the nuts by thoroughly tilling a square foot of soil.
  - b. Put two nuts 3 to 4 inches apart in each hole or seed spot for not every nut is fertile. After a few months, if both come up, cut one tree off provided indications are that both will come through, or transplant the extra one someplace where needed.
  - c. Plant nuts 2 inches deep and tamp soil firmly. Too deep planting is not desirable.
  - d. A mattock, broad pick, or narrow spade may be used to plant the nuts. When planting in grass, make a seed spot about 3 feet across to check competition from weeds and grass.
2. Planting in the garden for transplanting.—Plant nuts 2 inches deep and 2 inches apart in rows about one foot apart.
3. Seed spots or trees should be spaced 8 feet each way which means about 680 per acre. Close planting of nut trees makes full use of ground for production of valuable timber, encourages straight, clean trees, and shuts out competing grasses and weeds.
4. A bushel of walnuts or butternuts contains from 1,000 to 1,400 nuts, enough to plant one acre if two nuts are planted in each seed spot. A bushel of shagbark hickory nuts contains about 2,700 nuts; a bushel of red oak acorns, 4,400 to 5,000; and white oak, 7,000 to 8,500.
5. Cultivate and hoe out all weeds and grass. Protect from fire and cattle at all times.



FIG. 10. PLANTING CUTTINGS CAN BE MADE EASIER BY MAKING AN OPENING WITH A SPADE OR AN IRON BAR

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## *Tree Planting*

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**T**REES MAY be obtained from several sources, all of which are good if the stock is well rooted and healthy.

1. Cuttings of cottonwood and willow.
2. Native stock growing on the farm.
3. Seedlings and transplants grown in the home nursery.
4. Commercial nurseries.

### PLANTING CUTTINGS

Aside from reproducing themselves by seed, willows, cottonwood, and other poplars will reproduce from cuttings.

Cuttings are pieces of the parent tree, usually cut from branches one to three years old. Branch sections 12 to 16 inches long and  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches in diameter give the best results.

The cuttings may be made in the fall after the tree has become dormant or in the early spring after the frost has left the wood. Fall cuttings should be packed in small bundles and kept in moist sand, sawdust, or shavings until spring. If cuttings made in the spring

cannot be planted immediately, they, too, should be treated in this manner. Soaking cuttings for one or two days before planting insures better results.

Vigorous sprouts from a recently cut stump or healthy young branches of trees may be used. Young cottonwood trees 6 to 12 feet high may be cut into sections and used as cuttings.

Soil prepared in the same careful manner as for tree planting is suitable for planting cuttings.

An opening made with a spade or iron bar will make planting easier and guard against damage to the cutting during planting. The proper way to plant cuttings is to slant them at about a  $45^\circ$  angle with only an inch or so of the small end above the ground. The best time to plant is early spring.

### PLANTING SEEDLINGS

Seedlings of cottonwood, ash, elm, maple, or any suitable forest tree growing on the farm may be used. It is advisable, however, not to use trees which have been growing in deep shade or trees which are stunted, crooked, or otherwise deformed. Use vigorous, straight, clean trees from 1 to 3 feet



FIG. 11. ASH SEEDLINGS IN A FARM GROVE. VIGOROUS YOUNG TREES LIKE THESE ARE EASILY DUG AND ARE EXCELLENT FOR PLANTING A WINDBREAK OR FARM WOODLOT

high. Larger trees are more difficult to move and must be pruned to compensate for root losses. Care is necessary when digging trees to avoid tearing off or splitting the roots or damaging the bark on the stem.

Home-grown seedlings and transplants should be carefully removed from the seed or transplant beds. During all digging or transplanting operations the roots should not be unnecessarily exposed to the drying effect of sun and wind. Evergreens particularly are susceptible to injury by exposure. As the trees are removed from the soil they should be "heeled in" by scooping out a trench in which the trees can be placed and the roots and half the stem covered with dirt.

Trees from commercial nurseries may be kept in a cool, shaded place for a day or more if the roots are kept moist. If the trees cannot be planted for several days or a week, they should be "heeled in" in a cool, shaded place, and if dry, the soil should be watered.

## PREPARING PLANTING SITE

Preparing the land is an important operation because on properly tilled soil tree growth will be increased and later cultivation will be much easier. Land formerly in small grain should be plowed in the summer or fall preceding spring planting. It may then be readily prepared in the spring. Soddy land can best be brought into a good tilth for planting by plowing followed by disking during the season preceding planting. Heavy sod should not be planted until it has been thoroughly cut up and has grown several crops.

On steep hillsides which are in danger of eroding or on land that is too rocky or full of stumps to plow, trees may be planted in "scalps." Scalps are areas about 18 inches square from which the sod, roots, and rocks have been removed and the soil loosened so the tree may be readily planted.

## PLANTING

Remove the young trees from the "heel in" place or nursery bundle and place them in a bucket partially filled with water. In this way they may be conveniently carried about while planting, and roots will not dry out and die.

The hole method of planting is best. Make the hole deep enough and wide enough so the roots will not be crowded or doubled up.

Keep the roots spread out and pack the soil firmly about them. The tree should be no deeper in the ground after it is planted than before it was dug.

## Spacing

For woodlot planting, a spacing of 6 feet between trees in the row, with the rows 7 feet apart, will produce good results. By this spacing 1,040 trees would be planted per acre.

In a shelterbelt a spacing of 6 x 8 feet is recommended. The conifers should be planted on the inside, about 16 feet from the last row of hardwoods. A spacing of 10 to 15 feet may be needed between all rows in order that tractor-drawn tillage implements such as a tandem disk or a springtooth harrow may be used for cultivation.

## CULTIVATION AND PROTECTION

Cultivation is essential to successful tree planting. Weeds use moisture needed by the trees during dry periods. Deep cultivation is not necessary. Too deep cultivation close to the trees will destroy some of the side roots. Avoid hilling up of the soil about the trees. Cultivation with a corn plow or single disk often results in this condition.

On steep land or where rocks and stumps prevent the use of power-drawn implements, weeds should be kept down by using a hoe or some other suitable tool.

Protection against fire damage and grazing by livestock must always be provided. Grazing animals rip off branches, peel off the bark, break down the trees, and with their hoofs trample out the roots and pack the soil so hard moisture cannot penetrate it readily. Heavy run off of rain water and an insufficient supply of soil moisture for the trees will be the result. Even after trees have become too large to be broken down or have the crowns damaged by livestock, farm animals will create a very unhealthy condition in the planting by browsing down the protective undergrowth and packing the soil.



FIG. 12. FREQUENT, THOROUGH CULTIVATION WILL KEEP THE TREES GROWING AT THEIR BEST. CULTIVATION IS THE SECRET TO GOOD RESULTS



## *Free Bulletins for You*

Club members enrolled in the 4-H forestry project will find the bulletins listed below useful when planning their forestry enterprise. These publications can be obtained through the local county agent or by writing to the Bulletin Room, University Farm, St. Paul.

### **MINNESOTA AGRICULTURAL EXTENSION BULLETINS**

Bulletin 196 Planting the Standard Windbreak  
Folder 85 Tips on Tree Planting  
Pamphlet 86 Earn AAA Tree Payments—1942

### **U.S.D.A. FARMER'S BULLETINS**

1123 Growing and Planting Hardwood Seedlings on the Farm  
1453 Growing and Planting Coniferous Trees on the Farm  
1501 Nut Tree Propagation  
1567 Propagation of Trees and Shrubs  
1591 Transplanting Trees and Shrubs  
1664 Christmas Trees as a Cash Crop on the Farm

UNIVERSITY FARM, ST. PAUL, MINNESOTA

Cooperative Extension Work in Agriculture and Home Economics, University of Minnesota, Agricultural Extension Division and United States Department of Agriculture Cooperating, Paul E. Miller, Director. Published in furtherance of Agricultural Extension Acts of May 8 and June 30, 1914.

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