2-1941

Nebraska 4-h Farm Forestry Third Year : Extension Circular 17-21-2

Earl G. Maxwell

E.C. 17-21-2

GROW TREES

for windbreaks and wildlife habitats

EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U.S. DEPARTMENT OF AGRICULTURE
COOPERATING
W. V. LAMBERT, DIRECTOR

GROW TREES for WINDBREAKS and WILDLIFE HABITATS

BY KARL LOERCH,
EXTENSION FORESTRY SPECIALIST

Requirements

The general subjects covered by this manual are the planting and raising of trees for windbreak, erosion control, and wildlife habitat purposes. It is intended as a help to boys, girls, and leaders interested in these forestry projects.

Project requirements are that you complete in all details one of the following:

1. Draw your planting plan of one of the above plantings, follow or otherwise prepare the ground on which you will plant at least 100 trees the following spring.

2. Draw your planting plan, plant and care for at least 100 trees to develop or improve a windbreak for the protection of one of the following: farmstead, livestock, garden, open fields and crops.

3. Draw your planting plan, plant and care for at least 100 trees or shrubs for erosion control or wildlife habitat.

YOUR TREE PLANTING PROGRAM

Introduction

Tree planting for the development of windbreaks to provide protection to man and animals has long been the most important of forestry activities in Nebraska. Many farm homes in the state have excellent windbreak plantings that serve as demonstrations of what can be accomplished with tree plantings. Windbreaks are planted to serve several different functions.

Farmstead windbreaks protect the farm home and the yard area from winter winds and drifting snow.

Field windbreaks are designed to benefit growing crops by reducing wind velocities and moisture loss and by helping stabilize the soil.

Livestock protection plantings allow cattle on feed to make better gains and protect range cattle from winter storms making the job of feeding and calving easier and more pleasant.

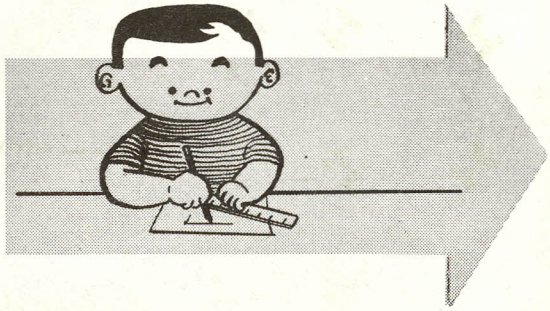
Garden windbreaks protect the growing crops from hot, drying winds and result in increased production.

Each of these types of windbreaks will be discussed in this circular. You should decide which type best fits the needs of your particular farm and make plans for developing it.

If you were building a new house, hog house, or barn, hours would be spent planning all the details of these buildings before starting the job. You could not expect a very satisfactory and useful building unless you did. Think of your windbreak as a necessary and important part of your farmstead in the same way as you think of these other improvements. The reason for making any farm improvement is to make your work easier and more profitable. A good windbreak will accomplish both and at a small fraction of a building's cost. Poorly planned windbreak plantings give little protection to man or beast.

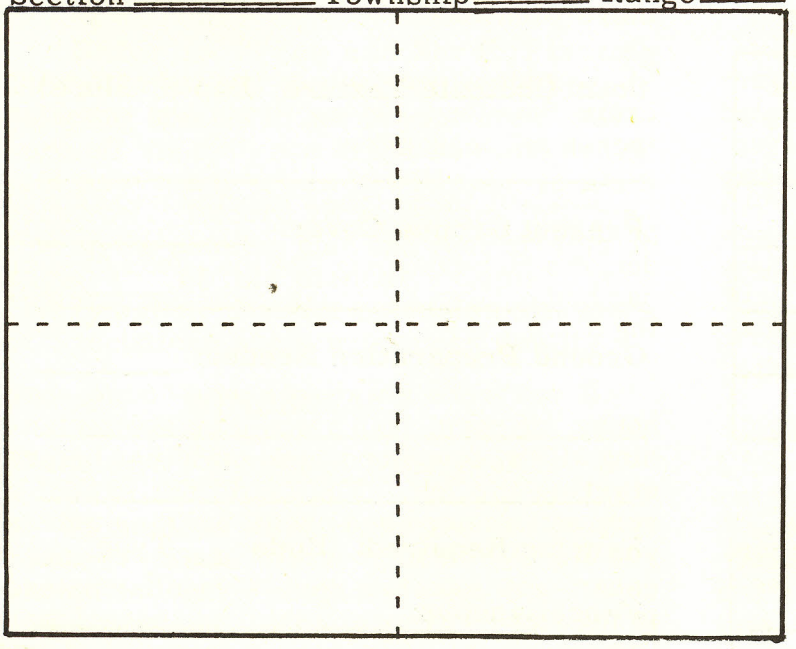
Drawing Your Plan

Your plans should go down on paper. First take a clean sheet of paper. Draw a map to scale of your farm, showing the arrangements of all buildings in respect to each other and to the location of lane, roads, fences, lots, and present trees.



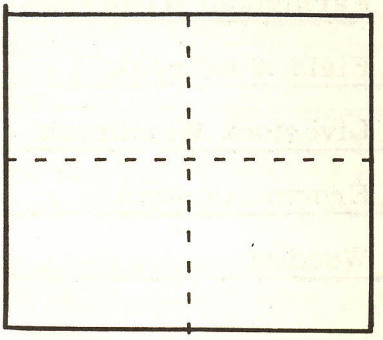
SKETCH OF PLANTING

Section _____ Township _____ Range _____



INSET

Show location of planting and extent of ownership



LEGEND

Farmstead
Fence Needed x-x-x
Area to be Planted
Existing Plantings
Scale

In preparing sketch of planting, disregard interior half section lines and scale for farmstead windbreak plantings. In all cases show (1) location of area to be planted, (2) new fencing required, (3) existing woodland and plantations, (4) roads, both private and public affecting plantings and (5) farmstead.

Remarks: Include statements such as quality of ground preparation, moisture conditions when planted, care received and information on rodent, insect and disease damage.

PLANTING PLAN AND RECORD

Name of Owner: _____ Address _____

Name of Operator _____

Location: County _____ Section _____ Township _____ Range _____

Type of Planting		Acres
Farmstead Windbreak		
Field Windbreak		
Livestock Windbreak		
Erosion Control		
Woodlot		

Soil: (Indicate Texture, Depth, Slope)

Present Ground Cover: _____

Ground Preparation Needed: _____

Method of Planting

	District	Farmer	Other	Acres
Machine				
Hand				

Fencing Required: Rods ___ Type ___

Miscellaneous: _____

For windbreak plantings row 1 always on north or west side

Spacing between rows _____

Row No.	Species	Spacing in Row	No. Trees Needed	No. Trees Planted	Survival 19__	Replacements 19__	
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Date Planned _____

Date Planted _____

The next step is to go over the ground with your parents or club leader and be sure you are picking the location that will give you the best possible protection. Decide if you are going to add to an existing planting or if it will require a completely new planting. Stake out your rows, measure the distance between rows and decide what kind of trees are to be planted in each row.

Refer to "Tree and Shrub Planting Guide" in back of manual for assistance in selecting species to use in your area. Measure off the distance in the row and decide just how many trees it will take to plant each row. Record all necessary information on the planting plan and record form on page 4 of this manual. Contact your county agent, district extension forester, SCS technican about windbreak details.

WINDBREAKS

Planning a Farmstead Windbreak

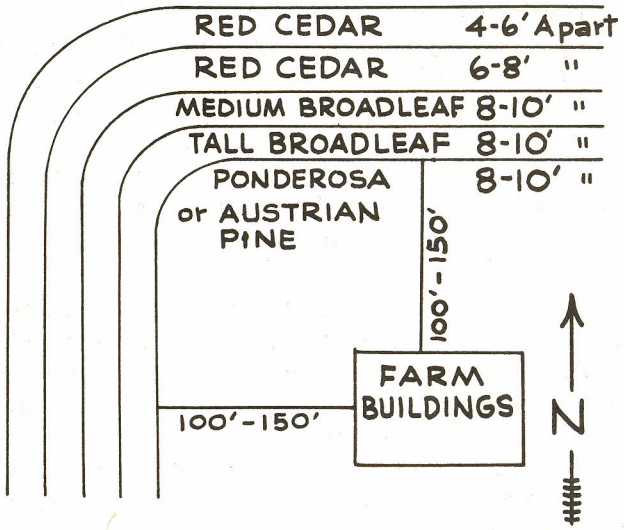
Farmstead windbreaks are designed to protect yards, lots, and buildings and should be located north and west of the area to be protected. They should be located at least 100 feet but not more than 400 feet from the main buildings for adequate winter protection. Windbreaks should extend to or a little beyond the east and south extremities of the yards and lots.

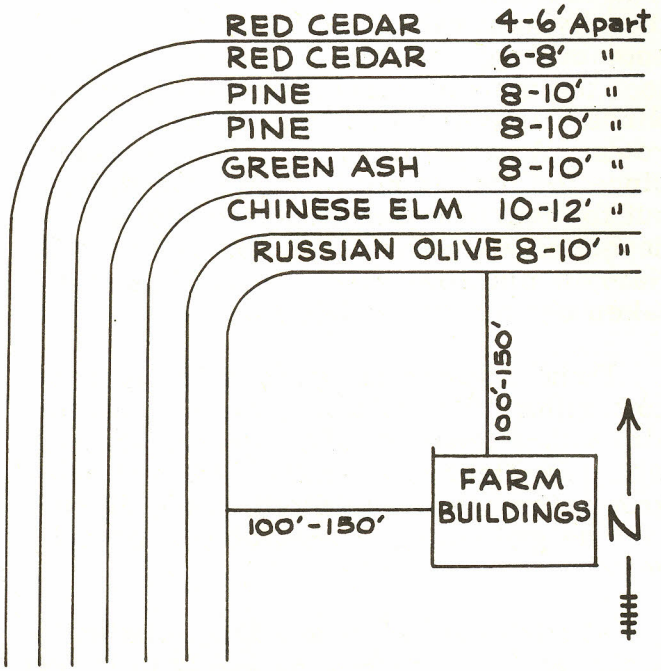
Farmstead windbreaks should be made up of five to ten rows of trees when both broadleaf and evergreen species are used. Such plantings should contain at least 50 per cent evergreen species. Windbreaks of four or less rows should consist entirely of evergreens. Often times the number of rows is limited by the amount of space available for the planting.

In order to be effective, a windbreak must have these two things, density and height. Density, particularly at the ground level, can best be attained by using low growing material that retains its foliage all the way to the ground, such as redcedar. Shrubs could also be used but they do not give the year round protection that redcedar does and are relatively short-lived. The proper location for redcedar and shrubs is in the windward rows -- the north and west.

Fast growing broadleaf species, such as Chinese elm and cottonwood, will give height to the windbreak in the shortest amount of time. However, it should be recognized that they are relatively short-lived and a more permanent type of tall growing tree, such as pine, should be included in the planting.

The following diagrams show suggested basic arrangements for farmstead windbreaks.





Spacing recommendations for planting trees in Nebraska will vary according to certain conditions, such as available moisture for tree growth, soil types, and width of cultivation equipment.

On the more favorable sites of eastern Nebraska or under irrigation conditions, plant the rows 12 to 16 feet apart with a spacing between trees in the row as shown in the diagram. Cultivate the plantings as long as possible.

On drier hardland sites of central and western Nebraska, plant the rows 16 to 20 feet apart using the minimum spacings between trees in the row as shown in the diagram. Plantings on these sites will require a longer period of cultivation and in some instances continuous cultivation is recommended.

In the sandhill area where cultivation is not practical, plant the tree rows 10 to 16 feet apart using the minimum spacings between trees in the row. Trees may be planted in the bottom of furrows leaving an undisturbed strip of sod between the rows in an attempt to keep the soil in place. Do not prune the lower branches of the trees to facilitate cultivation as this reduces the effectiveness of the windbreak.

Planning a Field Windbreak

Field windbreaks are designed to reduce wind velcities over a rather large area, and thereby help reduce soil erosion, control snow drifting, conserve moisture, and protect the growing crops from hot, drying winds. They should consist of one to three rows. A wide planting is not necessary since the idea is not to stop snow drifting but to control it and cause the snow to be deposited where it will be most beneficial. Narrow plantings also require less land taken out of crop production.

Do not use species known to be vigorous competitors for moisture, such as Chinese elm and cottonwood. Evergreens are best suited for field windbreaks. When a faster growing broadleaf is desired, use such species as green ash, honeylocust, or mulberry.

Spacing between rows should be ten to twelve feet for evergreens and 12 to 14 feet for broadleaf species. Spacing between trees in the row should be as follows: Windward row (redcedar), generally on the north, four to six feet, second or third rows of pine or broadleaf, eight to ten feet. For single rows plant redcedar four to six feet apart, pine six to eight feet, and broadleaf species eight to ten.

Field windbreaks oriented in an east-west direction give best results in terms of influence on the crops. Yields are increased more in fields located north or south of windbreaks.

The height of the windbreak determines how great an area will receive protection. A 50 to 75 per cent reduction in wind velocity can be expected for a distance of about 15 times the height of the planting. Thus, assuming an ultimate height of 30 feet, the windbreaks should be located approximately (30 x 15) 450 feet apart to get protection over the entire area. On sandy soils highly susceptible to wind erosion an interval of 20 rods between windbreaks should be used.

Planning Livestock Protection Plantings

The farmstead windbreak often serves not only to protect the farm home but also the feedlot areas. Where a separate planting is needed for protection of livestock in the feedlot areas, the design would be the same as for farmstead windbreaks.

For protection of livestock in the range or grassland areas of the state, (sandhills) a block-type planting is recommended. It is generally considered that a planting 300-400 feet wide and 1200 to 1500 feet long will provide adequate protection for 100 head of cattle. The planting should be located in such a place that it will intercept the path of normal livestock drift before storms. This is usually in the southeast section of the grazing area. In large pastures, a series of these plantings may be required.

Since most of the livestock protection plantings for winter range are made in the sandhill region where cultivation is not recommended, only evergreens should be used. It is almost impossible to establish broadleaf species without cultivation of the young trees. Recommended trees are redcedar and pine.

The arrangement and spacing should be as follows: Ten to 15 rows of redcedar on the windward side followed by 15 to 20 rows of pine. Spacing between rows should be ten to 14 feet with spacings between the rows of four feet in the two windward rows of redcedar and six feet in subsequent rows, and eight to ten feet between the pines.

An alternate composition for these plantings that would require fewer trees but still accomplish an equal degree of protection, is to use two to four rows of redcedar on the windward side as a snow trap followed by a gap of 75 to 100 feet. Then the main planting could be made up of four to six rows of redcedar and ten to 14 rows of pine.

Planning a Garden Windbreak

Windbreaks located on the south and west sides of garden areas are of great importance in order to make it possible to grow vegetables most successfully.

Avoid using large trees that will sap moisture from the garden area or shade the crops. Redcedar and most shrub species planted as a single row make excellent garden windbreaks. Proper spacing distances are two to four feet for shrub species and four feet for redcedar. Shrub species such as chokecherry, Nanking cherry, Juneberry and buffaloberry make satisfactory garden windbreaks and also produce edible fruit.

PLANNING A WILDLIFE HABITAT PLANTING

If your farm does not have an area that provides protection and food for wildlife you may want to plan and develop one.

In picking a location for a wildlife habitat planting, choose an area that is not of great economic value to your farm as far as the raising of crops is concerned. These places very often are along ravines, fence rows, odd corners or badly eroded areas. Your habitat should be planned so that all the essentials of life -- water, food and shelter -- are present within the habitat or very near by. A wildlife habitat an acre in size or larger can be planned to provide these.

A row of multiflora rose planted around the outside may eventually make a fence around the area. On the inside of this planting, at least on the north and west, two rows of cedar are good. These trees should be spaced four to six feet apart in the row in order to form a tight wall against wind and snow. This type of boundary and shelter should keep most of the snow outside the habitat. Without this outside protection during severe blizzards snow will cover all available feed within the habitat and many times drift over and kill many birds.

The planting of shrubs and low growing trees in this protected area is your next job in developing your planting. Use such trees and shrubs as Nanking cherry, buffaloberry, honeysuckle, chokecherry, wild grape, Russian olive, plum, and redcedar. It is a very good idea to plant a strip of grain sorghum if your space is adequate. If this is done, food will be close at hand and available throughout the winter months. Many of the shrubs supply food during the summer and fall but this is generally consumed before winter when food is most important. The range of adjoining fields is always a source of food. Travel lanes made by planting a row of shrubs or tall grasses give animals protective cover when going between the habitat and food source. These can best be established along fence rows, irrigation ditches, and field borders.

YOUR PREPARATIONS FOR PLANTING

The final success with tree planting in Nebraska depends largely upon how you:

(1) prepare the ground for the planting.

(2) handle and plant the trees.

(3) take care of them after planting.

Preparing the Ground

Because eastern Nebraska usually receives more rainfall than western Nebraska, recommendations as to preparing the ground vary. Sandy soils are also treated differently than medium and heavy textured soils to prevent wind erosion.

In eastern Nebraska the planting site should be prepared by plowing or listing in the fall. Leave the soil in a roughened con-

dition to prevent wind erosion and to catch and hold winter moisture. Then work the ground well in the spring by disking or harrowing.

In western Nebraska the planting site should be summer fallowed at least one year prior to planting in order to conserve moisture. Then work the ground well in the spring just before planting.

If planting is to be done on rolling land, plow or list on the contour rather than up and down the slopes. This practice will decrease runoff and save as much moisture as possible.

Sandy soils are subject to wind erosion. For this reason, no preparation of the site prior to planting is recommended. Planting should be done in shallow furrows. Leave the sod between the rows undisturbed.

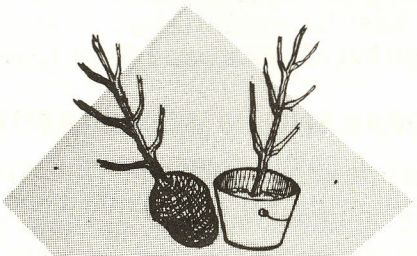
Handling the Trees

When the seedling trees arrive from the nursery, open the bundle immediately and place the roots in a bucket of water or thin mud. Plant as soon after arrival as possible. Trees may be allowed to stand in a bucket of water or thin mud overnight.

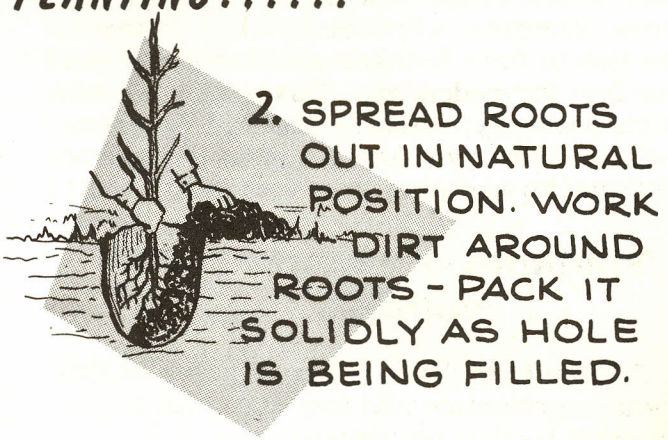
If it is necessary to hold the trees for more than a day, they should be "heeled in" until ready to plant. This term means covering the roots in a sloping trench to avoid drying. Locate the trench of "heel-in bed" in a place that is protected from drying winds - preferably in the shade. If the trench runs east and west, cut the south bank off at an angle of 45 degrees. If the trench runs north and south, cut the west bank at an angle of 45 degrees.

Spread the trees along the trench with roots in bottom and tops against the sloping bank. Cover the roots and most of the tops with moist soil. Keep the soil well watered and moist. Broadleaf trees can be held for several days with little danger of injury. Evergreen transplants are a little more difficult to handle, but can be held for a few days if necessary.

STEPS IN TREE PLANTING.....



1. KEEP TREES WRAPPED IN BURLAP OR ROOTS IMMERSED IN A BUCKET OF WATER OR THIN MUD.



2. SPREAD ROOTS OUT IN NATURAL POSITION. WORK DIRT AROUND ROOTS - PACK IT SOLIDLY AS HOLE IS BEING FILLED.

3. USE YOUR HEEL FOR SOLID PACKING.

4. WATER TREE WELL BEFORE PUTTING ON LAST SHOVEL OF DIRT

5. ADD SOME LOOSE DIRT AFTER WATER HAS SETTLED

Planting the Trees

When you are ready to plant, carry the trees to the field wrapped in wet burlap or with the roots immersed in a bucket of water or thin mud. Be sure not to expose the roots to the sun or wind.

Plant the trees about one inch deeper than they stood in the nursery. In planting, spread the roots out in a natural position. Work the dirt around the roots and pack it solidly as the hole is being filled. Use your heel for solid packing. Do not place sod and trash in contact with the roots. Leave the surface loose and slightly cupped to catch rainfall. If you are planting by hand, water the tree well before putting on the last shovelful of dirt. Let the water completely settle, and then add some loose dirt.

If you have over 600 trees to plant, use a tree-planting machine. Your Soil Conservation Service may have one available for use. If a planter is not available, use the furrow method. Plow one furrow at a time, space the trees, dig deeper holes with a shovel if necessary, and plant one row at a time.

Avoid planting small trees in deep depressions, especially on hard land. They may be buried by soil during heavy rains.

When to Plant

As a general rule, you will have best success in Nebraska when early spring planting is practiced. This is very important if you can not irrigate. Fall plantings may be successful with irrigation, but even then, winter drying often does great damage.

Transplanting Older Trees

Transplanting should be done during the dormant season, and early spring is considered the best time in Nebraska. It is important that the trees be moved with a ball of earth on the roots. One method that you might use is the "open-bottom bucket" method. Many people have used the method with a great deal of success.

First cut the bottom out of a five-gallon paint bucket.

Next dig the holes to the depth of the bucket where the trees are to be set.

Place the bucket over the tree to be transplanted and push it down as far as it will go.

Then with a spade dig around the bucket, being careful not to disturb the ball of earth beneath the bucket. To avoid this, set the spade at an angle and pry the dirt away from the ball.

Shave the dirt down the sides of the bucket and gradually work the bucket down to its own depth. Dig underneath, tip the bucket to one side, and with a long-handled sharp pointed shovel cut any roots beneath the container.

Lift the bucket and tree out and move to the new location. In sandy soil it may be necessary to slip a burlap sack underneath to prevent the soil from falling out.

Set the bucket with the tree in the hole and fill in some loose soil.

Pull the bucket up part way and pack the soil well. If the bucket can not be separated from the ball, pour in enough water to cause it to loosen.

Continue filling in soil until the hole is about full. Then remove the bucket and water the tree well.

When the water has completely settled away, add some loose dirt. Leave the dirt loose and the surface slightly cupped to catch rainfall.

Tend your Trees the Year Around

Many tree planters are very enthusiastic about getting their trees planted in the spring. They do a good job of everything up through the planting of the trees, then seem to forget them. These same people would not think of planting their corn, then forgetting it. They become frantic if the weeds and grass start to grow in their corn field and certainly would not allow livestock to tramp and eat their corn. Oddly enough, these people seem to give little thought as to the effect of poor care and lack of protection for their trees.

Treat your trees as you would any other crop. Help them in their fight for survival against drought, weeds, insects, and animals by giving them the best of care and protection. Visit your tree planting often, the year around, to determine any attention it may need.

Protect from Animals

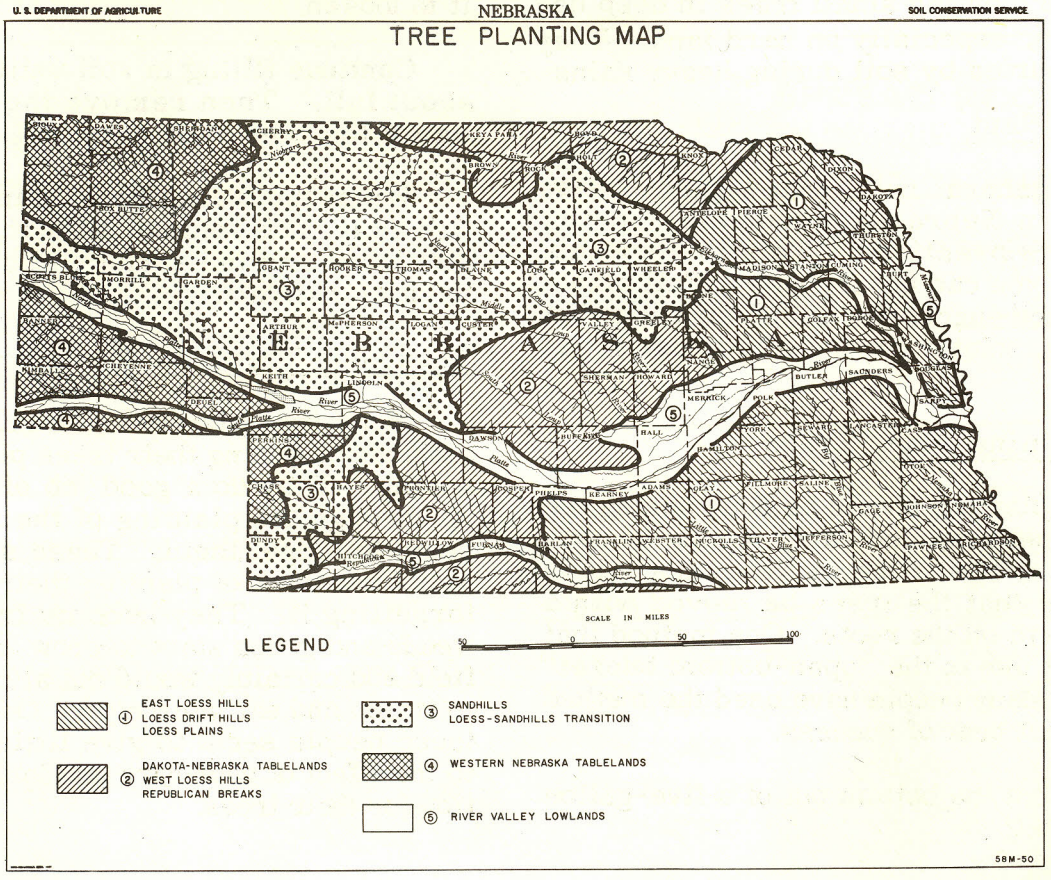
Animals are injurious to trees, regardless of whether your trees are young or old. The packing of the soil around the roots, the browsing, the barking by large animals, and the scratching of earth from around the root collar and exposing roots of trees by poultry are some of the damages from which your trees will need protection. Rabbits and mice are harmful usually during the fall and winter. Barking and even cutting off some species of small trees by rabbits is possible. Your trees can be protected by a guard made of hardware cloth placed around the stem of the tree. Mice usually cause little damage if all trash is removed from the area directly around the base of the tree.

Cultivation

In all parts of the state the grass and weeds should be removed in the area of the tree row by cultivation and hand hoeing. However, on sandy land where your trees are planted in a furrow, leaving the vegetation between the rows, the strip along the tree row is all that should be cultivated.

In parts of the state where the ground has been prepared for planting by plowing, it is best to cultivate and remove all the weeds and grass not only in the row but also between the rows of trees. The cultivation should not be deep and the land should be left as level as possible without ridging the soil up around the trees. Your trees should be cultivated for several years or until they have reached a growth that will partially shade out grass and weed growth. The trees by this time will be well established, and after several years of clean cultivation the weeds will be much less of a problem.

Some attempts have been made to control weeds by planting brome grass or other aggressive grasses between the rows of trees after the first year of cultivation. This is a very poor practice and should not be used. Such grasses will smother out weeds but will give your trees the worst kind of competition for available moisture and plant food.



TREE AND SHRUB PLANTING GUIDE

Tall Growing Deciduous Trees

Species	Areas	Recommendations
Chinese Elm	1, 2, 3, 4, 5	Drought resistant, fast growing, short lived, will tolerate alkali soils.
American Elm	1, 2, 3, 4, 5	Plant where moisture is abundant. Use caution because of phloem necrosis, Dutch elm disease, and European elm scale.
Honeylocust	1, 2, 3, 4, 5	Hardy, does well in western Nebraska. Will tolerate alkali soils.
Cottonwood	1, 2, 3, 4, 5	Rapid growing. Plant on moist, well drained sites.
Hackberry	1, 2, 3, 4, 5	Relatively slow growing, drought resistant.
Green Ash	1, 2, 3, 4, 5	Hardy, rapid grower on good sites, some trouble with borers.
Bur Oak	1	Slow growing, moist creek beds and banks.
Black walnut	1	Slow growing, needs fertile moist soils, very valuable for its wood.

Medium to Short Deciduous Trees

Russian Olive	1, 2, 3, 4, 5	Hardy, rapid growing, tolerates alkali soils.
Russian mulberry	1, 2, 3, 4	Bushy, suitable for outside row of windbreak and wildlife plantings. May freeze back near northern and western limits.
Boxelder	4, 5	Hardy, will grow in all regions but should be replaced with more valuable species in areas 1-2-3.
Willow	1, 2, 3, 4,5	Plant on poorly drained sites, swampy lands.
Osage Orange	1	Moist soils; one of the best post species.
Black Locust	1	Subject to borer damage. Good post species.
Catalpa	1	Moist to moderately wet sites. Good post species.

Evergreens

Redcedar	1, 2, 3, 4, 5	Hardy. Plant on windward side of your windbreak makes fair posts. Do not plant in Otoe, Cass, Sarpy, Washington, Richardson, Nemaha and Douglas counties.
Ponderosa pine	1, 2, 3, 4, 5	Hardy. Good rate of growth after establishment. A possibility for Christmas tree plantings. Good windbreak species.
Austrian Pine	1, 2, 3, 4, 5	Hardy. Good rate of growth after establishment. Probably a little better than Ponderosa for Christmas tree plantings due to its shorter leaves. Will tolerate alkali soils.
Douglas-fir	1, 5	Good rate of growth. Has not been planted extensively in Nebraska. Seems satisfactory. Worth trying on limited basis. Will make attractive Christmas tree.

Shrubs

Nanking Cherry	1, 2, 3, 4, 5	Excellent for low garden windbreaks. Fruit makes good jelly. Good wildlife food also.
Lilac	1, 2, 3, 4, 5	Hardy, will tolerate alkali soils.
Honeysuckle	1, 2, 3, 4, 5	Bushy, good shelter for wildlife.
Buffalo-berry	1, 2, 3	Valuable for wildlife food.
Cotoneaster	1, 2, 3, 4, 5	Provides food and protection for wildlife.
Multiflora rose	1	Valuable as wildlife protection. Could be used as a living fence around wildlife habitats.
Chokecherry	2, 3, 4, 5	Source of food for wildlife.
American Plum	2, 3, 5	Protection and food for wildlife.
Sand Cherry	4	Source of food for livestock. Do not plant on alkali soils.