

CONSERVATION TREES FOR NEBRASKA



Nebraska's
Natural Resources
Districts

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SITE PREPARATION

Good site preparation is the key to a successful tree planting project. Seedlings planted on a well-prepared site will grow faster and have much higher survival rates than seedlings planted on a site with little or no preparation. It has been said that you plant a \$1 tree in a \$10 hole. It is far cheaper in both time and money to take the time up front to plan, prepare, plant, and maintain a project than to let it fail and try to replant or inter-plant seedlings into a failed planting.

What is site preparation? Site preparation is the process of creating soil conditions that will allow either desirable volunteer seedlings or planted seedlings to become established, grow, and survive. This means destroying all existing woody and herbaceous vegetation as well as sod-forming grasses that will compete with your seedlings for growing space, sunlight, water, and nutrients. The destruction of competing vegetation will greatly improve the growth and survival of your seedlings.

Why is site preparation so important? Site preparation is important because it creates soil conditions that ensure good root to soil contact and allows for the growth of the seedling's root system. The major cause of failure in conservation tree planting projects is air pockets in the soil (poor root to soil contact) and soil compaction. Good site preparation can avoid both situations.

PASTURE

What is the best way to prepare a site for planting trees? The existing vegetation on your site will dictate how you should prepare the site for planting. The best method for preparing a site where grass sod or alfalfa are present is to follow these five steps. First, you should mow or shred the existing vegetation two to three weeks before the herbicide application is made.

The best time to apply herbicide treatment to alfalfa or cool-season grasses is early fall any time after Sept. 15 to as late as Oct. 15. Pasture dominated

by warm-season grasses goes dormant earlier. Therefore, herbicide applications would need to be made in late August or early September.

Next, destroy the existing vegetation with a herbicide application. You can use a herbicide like Fusilade, or Roundup to destroy grass sod. Herbicides like 2, 4-D or Banvel can be used to destroy alfalfa. For more information on herbicide treatments, see University of Nebraska Extension publication NF98-363: Chemical Weed Control in Tree Planting Projects, Part II - Post-emergence Herbicides.

Allow the herbicide application at least two to three weeks to kill the grasses. Then use a chisel or moldboard plow to break up the dead sod.

Next, disc and harrow, or rototill the plowed area to break up soil clods and chunks of sod. Plowed areas may need to be disced more than once. It is important to note that when you are preparing your land for planting you can work either the entire site or just the strips where you will plant the seedlings.

Once the area has been thoroughly worked up, allow the area to lay fallow through the winter. The action of freezing and thawing will mellow the soil and help to create an ideal planting site.

Finally, you should disc or harrow the soil again in the spring before tree planting. This will break up any remaining soil clods and ensure that the soil will close back in around the seedlings after they are planted.

If you are planning to use water-conservation mulch, NRDs recommend that you prepare the entire site or till strips that are at least 8 feet wide. This will make it much easier to lay the mulch correctly.

CROP GROUND

Crop ground should not need to be prepared like pasture or sod-bound sites. However, it is recommended that you follow these three steps to prepare a crop ground site for tree planting. First, disc and harrow, or rototill the crop stubble in the fall after harvesting. It may be necessary to plow heavier soils to break up any deep soil compaction. You can work either the entire site or just the strips where you will plant the seedlings.

Second, allow the area to lay fallow through the winter, the action of freezing and thawing will mellow the soil and create and help to create an ideal planting site.

Finally, you should disc or harrow the soil again in the spring before tree planting. This will break up any remaining soil clods and ensure that the soil will close back in around the seedlings after you plant them.

WINDBREAK RENOVATION

Site preparation for windbreak renovation or reforestation projects will take extra work. First, you will need to remove the existing trees. This can be done by bulldozing. However, it will be



less expensive and more desirable if you can find a market and sell the trees for timber, firewood, or chips. The best time for tree and stump removal by bulldozing is from mid-August until the ground freezes.

Once the trees have been removed, the area should be root raked by a bulldozer. The site should also be plowed as often as necessary to break up any deep soil compaction and to remove any remaining roots and trash, which might be left over from the removal process.

Third, it is recommended that you plant the area to a cover crop the following spring to allow the soil to recover and to ensure that all the roots and other large woody material have been removed from the site.

Planting the area to a cover crop will help the soil to regain some of its former structure and reduce soil compaction. Soil compaction is a major problem for tree planting since compacted soils are difficult to close around tree roots and difficult for tree roots to grow into. If you choose to plant these areas with a cover crop, then you can either harvest the crop or plow it under and disc it down. Either way you will need to disc or rototill the soil again in the spring before planting.

CLOSING THOUGHTS

Site preparation is one of the most important things that you can do to ensure the success of your tree planting project. While it may seem like a lot of work to get your site ready to plant tree seedlings, the benefits you gain in terms of reduced need for weed control and increased seedling growth and survival will more than pay for itself in the end.

GOOD PLANTING TECHNIQUES

SEEDLING HANDLING

Reforestation surveys indicate that the most common problems facing seedling survival are moisture stress, poor handling, and physical damage before planting. From the time seedlings are lifted from the nursery bed to when they are planted, it is critical to keep the seedlings moist (relative humidity 90-95%) and cool (34-36 degrees F). Seedlings must remain in a state of dormancy during this period. As temperatures rise, plants begin to respire and can quickly deplete their energy reserves. Damaging molds can also grow on seedling roots under warm conditions. If seedlings are allowed to dry out, the root hairs become permanently damaged and are unable to absorb adequate water and nutrients. Physical damage from handling can impair root hair, shoot tips and buds, which will slow initial growth of the seedlings.

HAND PLANTING

Hand planting is necessary on rough terrain, when the seedlings are too large for machine planting, or when planting within an existing forest. The most common tools used for hand planting include a shovel, planting bar (dibble) or hoe dad. Three basic methods of hand planting are dug hole, slit planting and wedge planting.

When planting by hand, remember to keep the seedlings shaded, cool and moist at all times. Do not leave packages of seedlings exposed to sunlight and warm temperatures at the job site. Use a reflective tarp and consider delivering the stock in stages during the workday. Carry seedlings in a



planting bag or bucket along with wet burlap to keep the root systems moist. Handle the roots as little as possible and do not carry the seedlings exposed to the air or immersed in water. The roots should hang freely in the planting hole and not be twisted or crooked. The new soil line should be slightly above the seedling's root collar. The soil should be packed firmly around the seedling to maintain good soil to root contact and eliminate air pockets.

MACHINE PLANTING

Machine planting is well suited for large orders, planting on even terrain and planting hardwoods with large root systems. Planting machines generally require a 30-50 horsepower tractor. A crew of three people is recommended: one person to drive the tractor, another to ride the planting machine, and a third person to provide seedlings to the planter and check for proper planting technique. The same stock handling principles listed previously apply to machine planting. Do not load too many trees in the machine's storage bins at one time. Instead, supply stock in small amounts to keep seedlings moist and cool. The average machine planting crew can plant 5,000 trees per day.



WEED BARRIER INSTALLATION AND MANAGEMENT

Weed barrier fabric, sometimes referred to as “conservation mulch” or “black plastic,” has become a useful tool in establishing conservation tree plantings in Nebraska and across the Great Plains. The material is a black polypropylene fabric with the appearance of tightly woven burlap. It is recommended and used most heavily in locations with droughty soils and areas that receive 24 inches of precipitation or less per year. When installed properly, benefits include reduced weed and grass maintenance, soil moisture retention and less chance of undesired sod grass establishment in the tree row. These benefits can help with improved survival, establishment, and growth of young tree seedlings.

The full usefulness and success with the fabric relies on proper installation by the contractor and the follow-up management of the material on-site by the landowner. Without the proper installation combined with management and follow-up, many tree plantings are at risk of poor tree health and failure.

INSTALLATION

Proper installation is critical for the fabric to provide the most benefits and not become a negative to the tree planting. With the expense of the fabric and installation, customers have a right to expect correct installation.

- The fabric should be installed no later than 30 days after the trees are planted to ensure adequate weed control and/or water conservation. For best results, the fabric should be installed right after the trees are planted and have a funneling effect to direct water to the seedling.
- Fabric should be stretched tight and lie flat on the ground without a deep furrow in the tree row that holds the fabric off the ground. If the fabric is too far off the ground around the seedling, then hot air and rodents can easily get under the fabric. If the tree planting machine has left a furrow, the ridges should be packed down. A slight furrow (so the fabric is less than 2 inches off the ground) is good to help funnel water runoff toward the base of the seedling.
- Fabric needs to be pinned or held down within 6 inches of the seedling to help direct the water to move into the cut area by the seedling. Funneling the water to the base of the seedling increases available moisture. The use of soil is discouraged since during heavy rains the soil will be washed off the fabric.



- Edges need to be firmly secured by pins when installed by hand or rolled under the soil when installed by machine. Both methods are to keep the wind from blowing underneath, working it loose and flapping in the wind.
- At the end of a roll where a new roll starts, the overlap splice should be held down with pins or soil can wash away.
- In areas of sloped ground over 30% where water erosion could start under the fabric, slight water turnouts or water bars should be erected across the furrow to divert water from eroding down the slope.
- During installation, the seedling should not be kept under the black fabric any longer than necessary due to heating up. Cut the fabric and pull the seedling out from underneath within 60 seconds during hot, sunny days to reduce heat damage to the seedling.
- The fabric should be cut in the shape of an X or T and not a single slit, so the fabric does not rub on the seedling. The cuts should be less than 12 inches with the seedling centered. Large holes cut during installation decreases the effectiveness of having the fabric since winds and hot temperatures can then take moisture out of the ground next to the seedling. Also, the larger openings allow for weeds and grasses to grow close to the tree seedling.

MANAGEMENT

The conservation mulch fabric does not degrade as well as advertised. If the fabric gets covered by sand, leaves, grass, etc. it will not degrade at all. Even exposed to sunlight, the fabric rarely degrades well enough for the tree stem to rip the material. The greatest risk of tree failure with the conservation fabric is having the tree girdled at the base with the tree trying to grow around the fabric. Rather than assume the fabric will degrade, the landowner should expect to have to cut the fabric around the tree base before the fabric starts girdling the tree.

Weed seed can still germinate and grow in the cut area next to the tree seedling. Weeds should be pulled when small and kept out of the area by the seedling. If allowed to grow too large, the weeds will choke out the tree seedling or when the weed is pulled out, the tree seedling may get pulled out also.

Approximately three to five years after planting (depending on tree type and growth rate), the fabric should be cut at right angles to allow for larger tree stem size. This new opening should be at least 18 - 24 inches for most shade trees and conifers. Larger growing trees like cottonwoods and silver maples may need larger openings. Making the cut larger at this time is OK since the tree seedling roots should be 24-36 inches out away from the base and the tree is large enough to shade weeds and other competition.

Fabric can be removed by ripping away from the tree stems or pulled off the tree row after the tree seedlings have become established and strong enough not to be pulled out during the ripping. Cutting the fabric down the center of the tree row prior or during the pulling process will separate the material and help keep the fabric from damaging the tree stem as it is pulled away.

Conservation weed barrier fabric is a useful and proven addition to conservation tree plantings on droughty and stressful sites. With proper installation and management, tree seedling survival and growth should be increased. However, without proper installation and awareness of the potential girdling risks, it can cause early decline and even death for trees as they grow and develop natural trunk swell at the base.

DRIP IRRIGATION

Drip or trickle irrigation is an efficient way to provide supplemental water to your conservation tree planting. Drip irrigation systems are intended to help tree seedlings survive and grow during the initial establishment growth phase, normally three years or less. Watering recommendations will vary depending on soil texture and weather. It is recommended that you monitor soil moisture with a soil probe or other adequate device to determine when irrigation may be necessary. When supplemental water is required, water long enough to thoroughly soak the soil profile throughout the root zone to encourage deep rooting. On



new plantings, this may be approximately 16-24 inches. The soil profile needs to dry out some between irrigations to allow for gas exchange with the root system. Thorough watering at less frequent intervals is more desirable for root development and seedling health than frequent, light watering.

The heart of a drip irrigation system is the emitter. It is designed to let out water at a rate so slowly that the emitters tend to drip or trickle, hence the name. This allows the water to be precisely applied at the base of each tree, only where it is needed. A typical drip irrigation system will connect to a standard hydrant where a filter and pressure regulator are installed. From here, a main line (typically $\frac{3}{4}$ or 1-inch black plastic pipe) extends to the planting and across the tree rows. At each row, $\frac{1}{2}$ inch lateral pipe is connected and is snaked in the row with emitters placed within 12 inches of each seedling. Emitters are pressure compensating, delivering approximately one gallon per hour to each tree.

When requested, a properly designed drip irrigation system will qualify for cost-share assistance and help to improve overall seedling survival and growth. For a moderate fee, services offered by your NRD may include system design and installation, in addition to maintaining an inventory of components if repairs are needed.

POST-PLANTING CARE

WEED CONTROL

Controlling competing weeds and grasses may be the most important thing you can do to ensure the success of your newly planted trees. Controlling volunteer woody vegetation, annual and perennial grasses, and broadleaf weeds may be necessary throughout the life of your planting. However, it will be most important during the first three to five years after the seedlings are planted. Eliminating competing plants can greatly improve the survival and growth of your seedlings. They will compete with your tree seedlings for soil moisture, nutrients, sunlight and space, and provide cover for rodents that can damage young trees.

There are several methods that you can use to control weeds within and between the tree planting rows. These include mechanical cultivation (hoeing, rototilling, etc.), mowing or shredding, mulching (organic or fabric mulches), and chemical control (pre- and post-emergence herbicides). If herbicides are used, their selection will depend on site conditions, tree species in your plantation and the weeds to be controlled.

Mechanical or hand cultivation can be a very effective way to control weeds and grasses around seedlings. When cultivating, you should clean an area at least 3 feet in diameter around each seedling. To avoid damage to the seedlings, stay at least 6 inches away from the stem and do not cultivate the soil deeper than 3 inches. You may need to clean cultivate around the seedlings two to four times each year depending on the growing season.

Mowing is a poor alternative for weed control. Although sometimes it is the only option on certain highly erosive sites. Mowing will reduce fuel buildup, rodent cover, and make the plantation more accessible for other management activities. However, it does little to reduce competition for moisture and nutrients and may encourage the growth of damaging perennial grasses like brome grass. Also, there is always the potential for damage to the seedlings. If you do plan to mow or shred between planting rows as a part of your maintenance plan, you should mow as often as necessary to keep the seedlings clearly visible.

Mulch can be used around seedlings to control weeds and reduce the loss of soil moisture. There are two common types of mulch: organic mulches and plastic fabric mulches. Organic mulches include composted yard waste or wood chips. When using organic material, a top dressing of nitrogen

fertilizer may be necessary to replace nitrogen lost from the soil as the organic materials decompose.

Fabric mulches suppress grass and weed growth within the tree planting row and conserve moisture in the soil. The key to making mulches work effectively is to eliminate weeds and grasses before laying the mulch. Fabric mulch is usually sold in rolls or pre-cut squares.

Herbicides do a good job of controlling weeds and grasses when applied in the proper amount at the right time. Herbicides can be grouped into one of two broad categories. Pre-emergence herbicides that control woody vegetation, annual and perennial grasses, and broadleaf weed species before their seeds germinate and post-emergence herbicides which are used to control established or emerged weed species.

Finally, it has been recommended that vegetation between the rows be controlled at least as well as within the rows.

However, there may be some benefit in allowing either row crops or warm season grasses to grow between these rows to provide protection for the young seedlings from hot, dry summer winds. The key to this method is not allowing the vegetation to crowd out the planted seedlings. Also, this vegetation should be disced, rototilled, or shredded in late autumn to remove or reduce potential cover for mice or rabbits that will feed on your seedlings over the winter.

SUPPLEMENTAL WATERING

Supplemental watering is another important maintenance activity that will greatly benefit your seedlings during the first three years.

If you want to improve the growth and survival of your planting, your seedlings will need at least 1 inch of water every seven to 10 days throughout the growing season. When you water your seedlings, you need to fill the soil profile thoroughly to ensure that the seedling roots have access to water. The best way to do that is by using a drip irrigation system or a soaker hose. If you do not have enough hose to reach your seedlings, you can fill a 5-gallon bucket and pour it around the seedling slowly, being careful not to expose any roots.

When watering, thoroughly soak the soil profile to a depth of 3 to 5 feet for established trees and 2 to 3 feet for newly planted seedlings. Do not water again until the profile has dried for established trees and the upper one foot has dried for newly planted seedlings. Thorough watering at less



frequent intervals is more desirable for root development than frequent, light watering.

Watering one or two times per week may be needed for newly planted trees. Two to five gallons of water per plant per watering should be applied to small trees, and five to 10 gallons for older, more established trees.

ANIMAL DAMAGE

Livestock should always be kept out of your plantation. They can destroy months of work and years of growth in a very short period due to destructive grazing. If tree and shrub seedlings are planted in a field that will be seasonally grazed, you should install either a permanent fence or a hot-wire to prevent livestock from grazing among the seedlings.

Predators like deer, rabbits, and mice can also destroy your plantation. Mice will girdle a tree seedling close to the ground during the winter months, while deer and rabbits will browse on the buds and main stem. The best way to prevent animal damage is to keep this area clean and free from competing vegetation. Disc, rototill, or shred vegetation in late autumn to remove or reduce potential cover and habitat for deer, rabbits, and mice.

Remember maintenance is an ongoing process. The benefits you hope to someday enjoy from your plantation cannot be accomplished with a single treatment. Tree planting by its very nature is a long-term commitment. Most tree species will easily live 60-80 years in a windbreak or shelterbelt planting. Some will live well over 100 years.



PRUNING

WHEN SHOULD YOU PRUNE?

The best time to prune branches from a tree to improve its form, wood quality, or condition is during the winter when the tree is dormant. This is due, in some part, to the fact that the insects that might be attracted to a fresh wound or the diseases that might infect a fresh wound are also dormant. However, pruning in the dormant season also gives your trees the best chance to compartmentalize and “wall-off” the wound to ensure that insects and disease do not create even more damage.

WHY SHOULD YOU PRUNE?

The type of pruning recommended is often referred to as corrective pruning. Corrective pruning is done to encourage the development of a faster growing, single-stemmed tree. Forked or multistemmed trees are prone to wind breakage and tend to put on less height growth.

WHERE SHOULD YOU MAKE YOUR PRUNING CUTS?

Natural Target Pruning removes only branch-wood and leaves the tree intact. The key components of Natural Target Pruning are locating the “branch-bark ridge” and the “branch collar.” The branch-bark ridge and the branch collar are important because these structures define and differentiate the wood of the branch from the wood of the stem. The branch-bark ridge is the area where the cambium of the stem and the cambium of the branch conflict with each other causing a “ridge” or up-thrust to form. The branch collar is similar except the timing of growth here causes them to overlap and we get the somewhat swollen look at the base of the branch.

If you make your pruning cuts outside of these two structures, you are removing the entire branch without removing any of the live portion of the tree. This ensures that the tree will compartmentalize this wound quickly and efficiently.

HOW DO YOU PRUNE BRANCHES?

Now that you know when and where to make your pruning cuts, let's talk about how to remove the branch to limit damage to the tree. The three-step method is designed to ensure that you do not rip or tear the bark or create a bigger wound by keeping the weight of the branch away from where you will make your final cut. The three-step methods can be described as follow:

- The first cut is a shallow notch made on the underside of the branch, outside the branch collar. This cut will prevent a falling branch from tearing the stem tissue as it pulls away from the tree.
- The second cut should be outside the first cut, all the way through the branch, leaving a short stub.
- The third cut removes the branch stub (outside the branch bark ridge and the branch collar) completing the operation.

The best time to prune a tree is when the saw is sharp. However, you can ensure that you are doing the best job possible to protect and improve your trees by pruning in the dormant season.



LONG-TERM CARE OF ESTABLISHED TREES

Conservation seedlings are often planted close together to gain maximum benefit as quickly as possible. However, as trees and shrubs mature, they begin to crowd one another causing the loss of foliage and branches. This crowding can lead to decline, dieback, and death. Symptoms of overcrowding include loss of foliage and branches, excessive weed growth or volunteer seedlings in and between rows and an increased incidence of disease and insect problems.

As your windbreak matures and the trees begin to crowd each other for space you are going to need to consider thinning out some of the trees. Depending on the age of the windbreak, the number of rows you planted and species you used you can remove individual trees or entire rows. The purpose of thinning is to redistribute the growth potential of the site to the best trees. You will want to remove those trees that are dead, dying or diseased; trees that have become overtopped, crooked, forked, or otherwise undesirable.

Some weed control may be necessary in mature windbreaks. Brome grass is tenacious and will grow under full shade and in between rows. Additionally, you are going to want to remove volunteer trees from your windbreak. These trees can cause serious harm to conifers shading out branches, crowding out





your long-lived hardwoods and making maintenance between rows difficult.

Pruning of dead, rubbing or hazardous limbs will be necessary from time to time. Forked or multistemmed trees are prone to wind damage. Select a dominant trunk and prune out forks and extra stems before they become 2 inches in diameter. Never remove more than 20% of the live material when pruning. Don't be afraid to remove dead or dying branches as these will eventually fall in a wind, snow or ice storm damaging other trees. It is recommended to wait until the tree goes dormant over the winter months before beginning any pruning.

During extreme drought, watering may be necessary even for older, established trees to survive. It is important to closely monitor your trees during drought conditions to see if watering may be necessary.

As the trees mature and you start to see decline and dieback throughout your windbreak, you will want to start thinking about removing and replanting some of the rows. Renovating a windbreak should start early enough to allow any new planting to become effective before windbreak protection declines.

To gain the maximum benefits from your windbreak, you are going to want to check your trees throughout the year and consider what maintenance needs to be done to keep them healthy and productive.



TREE SPECIES

Nebraska's NRDs offer a variety of trees and shrubs for conservation purposes. This booklet describes common trees and shrubs sold by NRDs. Each NRD administers its own tree program, so available species may differ from district to district. Check with your local NRD for the species they offer.

Accompanying each species description is an information box, which indicates the vegetative zones the tree is best suited for, the average height of the tree at 20 years and maturity, and the suggested row spacing for planting. You can also refer to the quick guide on pages 25-26 to compare species.

Soil characteristics are an important consideration when deciding what type of tree or shrub to plant. While helping to determine which trees are best for your site, your NRD or NRCS technician will refer to the NRCS "Soil Suitability Groups" for conservation trees and shrubs. By following the soil suitability recommendation, technicians can help you pick trees that should thrive in your particular soil conditions.





Austrian Pine

Pinus nigra

Austrian pine has pairs of needles 4 to 6 inches long. The needles are generally stiff, with the ends being very sharp to the touch. Originally introduced from Europe as an ornamental, it has considerable value in windbreaks and as Christmas trees. Austrian pine is best used in east or south inside rows of windbreaks.

Austrian pine is susceptible to Sphaeropsis (Diplodia) blight and Dothistroma needle blight and moderately susceptible to Zimmerman pine moths. Sphaeropsis blight and Zimmerman pine moths can seriously deform or kill trees if not controlled. Dothistroma needle blight can cause substantial defoliation in wet years or when trees are closely spaced if not controlled. Pine tip moths are occasionally a problem.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
18-30	35-55

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30





Black Hills Spruce

Picea glauca var. densata

Black Hills spruce is named for the area of South Dakota from which it originates and is a variety of the white spruce. It is a very dense, symmetrical, slow grower with green needles and is used for landscape, windbreak and Christmas tree purposes.

This spruce is slower growing than Colorado blue spruce with shorter needles and is more drought

tolerant. Black Hills spruce is very resistant to winter injury and has fewer insect and disease problems than Colorado blue spruce.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
15-30	25-45

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	18-30



Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
18-25	30-45

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	18-30

Colorado Blue Spruce

Picea pungens

Colorado blue spruce is native to the Rocky Mountain region. The color ranges from dark green to silvery blue green. Blue spruce will form a very dense windbreak when planted close together, but they only have a medium growth rate. Colorado blue spruce is best used as the inside row of farmstead windbreaks. Survival is best if the seedlings are protected from drying winds by placing wooden shingles on the south and west sides. The tree cannot withstand long-term drought.



Spider mites can be a problem. Rhizosphaera needle cast can be a problem under persistent wet conditions.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
20-30	30-50

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	18-30

Concolor Fir

Abies concolor

Concolor fir, also known as white fir, is native to the mountains of western North America. The tree grows in an almost perfect pyramidal Christmas tree shape when young (and is often grown commercially as a Christmas tree). At maturity, the tree develops a dome-like crown. The short, flat, soft needles are silvery blue-green both above and below, although the undersides may have a whitish bloom.



Concolor fir is a fairly slow-growing, drought-resistant tree. It does best in deep, rich and well-drained soils. Avoid heavy clay and wet spots, such as near overirrigated lawns. This fir may need some protection on very windy, exposed sites.



Douglas Fir

Pseudotsuga menziesii

Douglas fir, while not native to Nebraska, has a good growth rate in the state. It has historically been a valuable western timber tree. The foliage and twigs also attract wildlife such as antelope and deer.

Not a true fir, the full-grown tree has a narrow crown compared to other conifers and has a nice bluish color. The thin scaled cone hangs down and is about 3 inches in length.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
20-30	30-50

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	18-30



Eastern Redcedar

Juniperus virginiana

Eastern redcedar is native to Nebraska. It is highly adapted to a wide range of sites and has the highest survival rate of any conifer planted in Nebraska. Its deep roots and small leaf surface make it very drought resistant. The foliage turns a russet color in winter. It is the primary species in most windbreaks. Redcedar is a prolific seeder and requires management.

Two foliage diseases, Cercospora blight and Phomopsis blight, can cause substantial defoliation and kill redcedar if not controlled. Cercospora blight is common and widespread. A third foliage disease, Kabatina blight, can kill branch tips but is not a serious concern. Spider mites occasionally cause damage, and young trees may require protection.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
12-26	25-35

Suggested Spacing (ft.)

Within Rows:	Between Rows:
10-18	16-30





Eastern White Pine

Pinus strobus L.

Eastern white pine grows on a variety of soils ranging from light, sandy to heavy textured soils. It has fair wildlife value. Gray and red squirrels, deer, mice and 16 species of song-birds have been known to eat the seed. White pine is frequently used for windbreaks and screens along fields and rights-of-way.

In dense stands, trees produce tall, cylindrical stems with pyramidal shaped crowns, characterized by distinctive, plate like branching, especially noticeable as the trees become older. Its evergreen needles are in clusters of five, soft, flexible, 2 1/2 to 5 inches long, and bluish-green in appearance. Its cones are about 4 to 8 inches long and 1-inch thick.

Diseases, including white pine blister rust, red ring rot, root rot, wood decay, and certain needle fungi, can cause losses in white pine stands. Such natural elements as snow, ice, and wind may also cause damage to white pine.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
25-35	35-60

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30



Jack Pine

Pinus banksiana

Jack pine is native to Canada and the Great Lake States. Needles are in pairs 1 to 2 inches long and are usually twisted. Cones are 1 to 1 1/2 inches long and persistent for many years. It is drought resistant and can be planted on a wide variety of sites, but is not recommended for limestone soils. It is best used on inside rows of windbreaks in central and western Nebraska, or as outside rows in eastern Nebraska. The jack pine's general pyramidal form and persistent branches makes it a good substitute for eastern redcedar.

Jack pine has no serious diseases, but pine tip moths can be a problem.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
18-30	35-45

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30



Limber Pine

Pinus flexilis

Limber pine is a medium-sized evergreen native to the Rocky Mountains. A few disjunct stands reach out on to the western High Plains including the Pine Bluffs area of western Kimball County, making it one of only two pine species native to the state, the other being Ponderosa pine.

The species is quite adaptable to a wide range of conditions including dry and infertile, rocky soils. Prefers some air circulation around its canopy, thus should not be planted in extremely tight groups. The tree has highly flexible branches that are able to withstand heavy snow and wind loads without breaking. It has soft, blue-green needles and light brown distinctive cones.

The seeds have high energy content and provide critical food for rodents and a wide-variety of birds. Squirrels, flickers, and mountain bluebirds often nest in the trees.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
15-20	25-40

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30



Norway Spruce

Picea abies

Norway spruce has been planted for wind-breaks and shelterbelts in western prairies, although it grows better in more humid environments. It is recommended for shelterbelt plantings in humid, severe-winter regions. Norway spruce grows best in cool, humid climates on rich soils. Preferred soils include well-drained sandy loams. It also grows well on almost all other types of soils.

Norway spruce provides important winter cover for a number of species of wildlife. Grouse eat spruce leaves and the seeds are consumed by a number of birds and small mammals.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
25-35	30-60

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	18-30



Pinyon Pine

Pinus edulis

The pinyon pine as known as the Colorado pinyon is native to the Four Corners area of Utah, Colorado, New Mexico, and Arizona where it is typically found growing with junipers on drier sites. It has been used in landscape and screen plantings in western Nebraska, especially the southern Panhandle. Pinyon pine is a good companion to Rocky Mountain juniper and should be grown in full sun on drier sites. It does not tolerate shade and should not be planted in tight groups with other evergreens as it prefers some air movement on its foliage.

Pinyon pine has a large, edible seed (nut) and has long been an important food and agroeconomic crop for southwest Native Americans.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
10-15	20-30

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30





Ponderosa Pine

Pinus ponderosa

Ponderosa pine is native to northwest and north central Nebraska. Needles are grouped in threes, and sometimes pairs, 5 to 10 inches long. Cones are 3 to 6 inches long and each scale is armed with a sharp recurved spine. It can withstand prolonged drought and is the best pine to use on severe sites. It is best used in east and south inside rows of windbreaks.

Zimmerman pine moths and Sphaeropsis (Diplodia) blight can be serious problems and can kill or deform trees if not controlled. Pine tip moths can stunt growth by killing branch tips and Dothistroma needle blight can occasionally cause defoliation if not controlled.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
18-30	35-55

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30





Red Pine

Pinus resinosa

Red pine can be used in tree strips for windbreaks and are planted to protect livestock, enhance crop production, and control soil erosion. It is an attractive tree that provides cover for several mammals and birds and is a good source of food for deer, birds, and small mammals. Red pine is a medium-sized tree.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
18-30	35-60

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30



Rocky Mountain Juniper

Juniperus scopulorum

Rocky Mountain juniper is native to northwest Nebraska. It is similar in appearance to eastern redcedar with a more compact pyramidal shape. It's drought resistant, prefers slightly alkaline soils, and retains a bluish-green color throughout winter. It is best used on the north and west outside rows in windbreaks.

Rocky Mountain juniper is subject to the same insect and disease problems as eastern redcedar. Rocky Mountain juniper is more susceptible than eastern redcedar to *Cercospora* blight, which is very common in eastern Nebraska. Rocky Mountain juniper is not recommended for planting in the eastern half of Nebraska.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
10-20	15-25

Suggested Spacing (ft.)

Within Rows:	Between Rows:
10-18	16-30



Southwestern White Pine

Pinus strobiformis

Southwestern white pine grows in Arizona, New Mexico and southwest Colorado. It is not native to Nebraska. Needles are in groups of five, soft, dark to bluish green, 2 to 4 inches long, and tips are often finely toothed. Bark is thin, rough, and furrowed.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
15-30	30-55

Suggested Spacing (ft.)

Within Rows:	Between Rows:
12-20	18-30

Young trees tend to be rather dense and symmetrical and pyramidal in shape. Its mature form tends to be open and irregular. It is more heat and drought tolerant than eastern white pine. White pine blister rust is a problem in southwestern white pine's native range.



American Elm

Ulmus americana

American Elm is native to most of Nebraska and is a fast-growing, long-lived tree as long as it is not affected by Dutch-Elm disease. Before the introduction of Dutch-Elm disease the tree was considered an important street tree. Selections of Dutch-Elm tolerant trees are becoming more readily available.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
15-40	15-60

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





American Linden

Tilia americana

American Linden, also known as American Basswood, is native to eastern Nebraska and does best in rich, moist woodlands and along river bottoms. The tree is a fast-growing tree and its soft wood is often used for carving, while its inner bark can be used to make rope for weaving.

It's very fragrant flowers bloom in early summer and is a great shade tree.



Nebraska Vegetative Zones



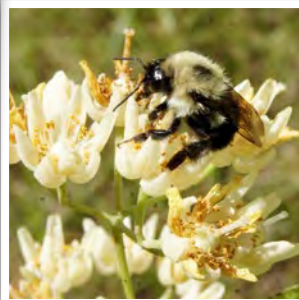
- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
20-35	30-70

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





American Sycamore

Platanus occidentalis

American Sycamore is native to extreme eastern Nebraska along the Missouri River though it has done well across the eastern part of the state. The tree can be very large. It can be planted in pure stands or mixed with other hardwoods.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
30-40	40-70

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Black Cherry

Prunus serotina

Black cherry, also called rum cherry, is a native species valuable for its rich, red-dish-brown wood. It grows best on deep moist, fertile soils in eastern Nebraska. The wood is used in fine furniture, and the cherries are used in jellies and wine. The cherries are excellent bird food during mid-summer. Black cherry does not grow naturally in pure stands. It should be planted either in wildlife habitat for a bushy large tree or with other species like walnut in a forest plantation.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
18-20	35-40

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30



Black Walnut

Juglans nigra

Black walnut is native to Nebraska's eastern and north central fertile bottomlands. It is highly prized for its rich, chocolate-brown wood and nut meats. Straight, limb-free trees are very valuable in the timber industry. Walnut trees have a medium growth rate and a long life span. Walnut requires a deep, silty-loam soil having good internal drainage for maximum growth. Walnut seedlings have been planted in the Sandhills for wildlife habitat and as a local source of nut meats.

Walnut caterpillars can defoliate trees in mid- to late summer, but this seldom does any permanent damage. Walnut is highly susceptible to broadleaf herbicide damage.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
20-26	40-50

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30



Bur Oak

Quercus macrocarpa

Bur oak is native to Nebraska. It grows on a wide variety of sites but grows best on rich, moist bottomlands. Bur oak has a slow to moderate growth rate and is fairly drought tolerant. It is an excellent species to include in wildlife habitat plantings. It is less susceptible to oak wilt than northern red oak and has no serious insect problems. Oaks may have to be protected from deer when young.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
20-26	35-45

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Cottonwood

Populus deltoides

Cottonwood is the Nebraska state tree. It is native across the state and usually is found adjacent to rivers, streams, and around lakes. Cottonwood has a fast growth rate and provides most of the lumber processed in Nebraska today. It is planted in riparian areas for filter strips, and near streams to reduce sedimentation and stabilize stream banks. It also can be used in multiple row windbreaks for height and quick protection.

Native trees can become infested by leaf beetles, twig borers and stem canker, but these are rarely serious problems.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
45-55	65-85

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Hackberry

Celtis occidentalis

Hackberry is a native tree found throughout Nebraska. It has a medium to long life span. Hackberry leaves are elm shaped; the grayish bark has a warty appearance. Once established, a moderate rate of growth and tolerance to adverse weather can be expected. Hackberry can be used in single-row windbreaks to slow summer winds and increase the snow catch over fields during the winter.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
22-28	45-55

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30



Witches broom on branches and nipple-galls on lower leaf surfaces can be unsightly, but cause little adverse effect.



Harbin Pear

Pyrus ussuriensis

Also known as Chinese pear, the harbin pear is the hardiest of all pears, introduced from northeastern Asia. The harbin pear is a small to medium tree for farmstead and field windbreaks and riparian plantings. It is used for food by a wide variety of birds and mammals and as a nesting site for songbirds. Grows 15 to 30 feet.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
15-25	15-25

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30



Honeylocust

Gleditsia triacanthos

Honeylocust is native to eastern Nebraska. This medium-lived, relatively fast growing tree lends itself well to windbreak plantings. The fine-textured foliage of the honeylocust gives partial shade and turns a golden yellow in the fall. Honeylocust is used in multirow windbreaks to increase the effective height of the windbreak. The twisted flat seed pods are 6-10 inches long. Cattle often eat the seed pods because they have a sweet taste.

Mimosa webworm and other insects present minor problems. Canker diseases may cause occasional branch dieback but are usually not serious problems unless the trees are in a weakened condition. The “thornless” variety is distributed.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
24-32	35-45

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Kentucky Coffeetree

Gymnocladus dioica

Kentucky coffeetree is a medium to large tree of the legume family reaching 50 to 75 feet in height on favorable sites. Grows naturally on moist, streamside soils but adapts well to varying soil types and conditions, moderately drought

tolerant when established. Open crowned with sparse branching. Fruit is a large brown pod.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
25-30	30-70

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Manchurian Apricot

Prunus mandshurica

Manchurian apricot is a small tree 15 to 20 feet tall. It has a beautiful pinkish flower that blooms in the spring before the leaves



emerge, and the leaves turn a nice yellow-orange color in the fall. The fruit provides food for wildlife during the fall, but the tree seldom produces fruit in the west due to its early blooming habits. It can be used for one of the outer rows in multirow windbreaks.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
12-16	12-16

Suggested Spacing (ft.)

Within Rows:	Between Rows:
10-18	16-30



Midwest Crabapple

Malus baccata var.

Mandshurica

'Midwest' crabapple is a medium-sized tree growing to 20 feet. It will have a rounded crown when open and will maintain its branches close to the ground. It is extremely hardy and disease resistant. The small apples are only 1/4 to 1/2 inch in diameter. The persistent fruit makes excellent wildlife food throughout the fall and winter. The white blossoms are especially attractive during the spring. Crabapple is good for single row windbreaks where a shorter tree is needed, and between the central and outside rows of multirow windbreaks. Avoid planting close to redcedar or juniper to reduce the potential for cedar-apple rust.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
12-16	12-16

Suggested Spacing (ft.)

Within Rows:	Between Rows:
10-18	16-30





Northern Catalpa

Catalpa speciosa

Northern catalpa trees are very fast growing trees with large heart-shaped leaves. Also known as Hardy Catalpa, Western Catalpa, Cigar Tree, and Catawba-Tree. The height at 20 years is about 20 feet. Catalpas prefer moist, deep, well drained soil, but adapts to dry or wet soils. The white flowers are on 4-8 inch long panicles in late June. Fruit is a long pod. Very tolerant of tough conditions.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
25-30	25-50

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Pecan

Carya illinoensis

Pecan is a large tree, 60-80 feet, with a broad rounded crown. Pecans are truly multipurpose trees. In the landscape, these long-lived and sturdy trees provide ample shade and bright yellow fall color. Wildlife conservationists appreciate the food and cover pecan trees produce for squirrels, turkeys, and deer.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
25-30	60-80

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Red Mulberry

Morus rubra

Red Mulberry is native to eastern Nebraska and does best in moist, rich sites. It is fast growing and known best for its fruit which are liked by birds and small mammals. The fruit can also be used in jams and jellies, typically reaching maturity in mid-summer. It grows best in open conditions.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
15-25	15-45

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Red Oak

Quercus rubra

Red Oak is native to eastern Nebraska and is a good shade tree. Red Oak attracts wildlife and in fall the tree has a good red color.

The tree produces a reddish-brown acorn that are about 1 inch long and is typically pest resistant and more tolerant of chlorosis high PH soils than other oaks in the Red Oak family.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
15-30	35-60

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Siberian Elm

Ulmus pumila

Siberian elm is sometimes called Chinese elm by mistake. It is adapted to almost all soil and moisture conditions in the state, but is usually short-lived. Siberian elm is



resistant to Dutch elm disease. The wood is brittle and breaks in wind, snow and ice storms. Siberian elm should be planted only on severe sites where other species are likely to fail. Siberian elm can be invasive on pasture lands in the central and east because of its prolific seeding.

Pest problems for the Siberian elm are elm leaf beetles and wetwood (slimeflux).

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
24-40	26-42

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30



Silver Maple

Acer saccharinum

Silver maple is a fast growing, long-lived tree native to eastern Nebraska. The species is ideal for wet bottomland sites and can easily recover from extended periods of flooding. It performs well on uplands, but does not tolerate alkaline or calcareous soil or drought conditions. Silver maple can be used in riparian buffer plantings. The wood of the silver maple is brittle and can break in wind, snow or ice storms.

Possible problems are multiple main stems, scale insects, green-striped maple worms, and maple bladder-gall mites.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
30-34	40-50

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30





Swamp White Oak

Quercus bicolor

Swamp white oak is native to the central and southern United States. It grows best on moist, bottomland forested soils. It is a large tree with specimens over 60 feet tall. The tree is valuable for wildlife habitat and for its wood. The wood is used in fine furniture, flooring, and wine casks.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
16-26	30-45

Suggested Spacing (ft.)

Within Rows:	Between Rows:
14-24	20-30



Washington Hawthorn

Crataegus phaenopyrum

Washington hawthorn is a medium-sized tree growing to 25 to 30 feet on better sites. It has thin spikes 3 inches long on the younger branches. In the spring, the rounded crown is filled with snow-white clusters of flowers. The resulting fruit is about a 1/4 inch in diameter and turns a bright red in the fall. The persistent fruit is great food for songbirds in the fall and winter. Washington hawthorn can be used for wildlife habitat or between the central and outside rows of multirow windbreaks. Avoid planting close to redcedar or juniper to reduce the potential for hawthorn rust.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
12-16	12-16

Suggested Spacing (ft.)

Within Rows:	Between Rows:
10-18	16-30





American Hazelnut

Corylus americana

American hazelnut is native to eastern Nebraska. Best growth is obtained on moist, fertile loam soils and can grow to 15 feet, but 8 to 10 feet is more common. It is medium to fast growing, and starts producing nuts within three to five years.



The nuts mature in late summer to early fall and are very tasty if you can collect them before the birds and animals.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
6-8	6-8

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20



American Plum

Prunus americana

American plum is native to Nebraska and is well adapted to a wide variety of soil and climatic conditions. It forms dense thickets ideal for the outside rows of windbreaks and for wildlife habitat. Birds use the thickets for nesting, feeding, and resting areas. The twigs are a preferred source of

browse for deer and rabbits

during the winter. White flowers bloom in May, with red to purple plums ripening during September. The earliest ripening fruit is usually the sweetest and makes the best jelly.

Brown spot, plum pocket and tent caterpillars can cause some problems.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
5-8	5-8

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





Amur Maple

Acer ginnala

Amur maple is an introduced medium- to large-sized shrub from northern Asia. It is somewhat drought



tolerant but subject to chlorosis on heavy alkaline soils. The leaves turn scarlet to deep red during the fall. It is best used for wildlife habitat and as the outside row on the leeward side of windbreaks.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
16-20	16-20

Suggested Spacing (ft.)

Within Rows:	Between Rows:
6-12	14-30



Arrowwood Viburnum

Viburnum dentatum

Arrowwood viburnum is an upright, rounded, multi-stemmed, deciduous shrub which typically matures to 6 to 10 feet tall with a similar spread. Non-fragrant white flowers appear in late spring. Blue/black berries attract birds and wildlife. Variable fall color ranges from drab

yellow to attractive shades of orange and red. Native

Americans

reportedly used the straight stems of this shrub for arrow shafts, hence the common name. The shrub is exceedingly winter hardy, grows in most soils at a medium rate and is a good background for native plantings.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years: Maturity:
6-10 6-10

Suggested Spacing (ft.)

Within Rows: Between Rows:
4-8 10-20





Caragana

Caragana arborescens

Caragana, also called Siberian peashrub, is a large upright shrub. It provides dense cover for wildlife and is ideal for the shrub row in a windbreak. In Canada, it is planted as single-row windbreaks. Caragana is adaptable to conditions of extreme cold and wind. It tolerates a wide range of soil types, including alkaline and saline soils.

Grasshoppers can be a problem, but very rarely kill an established plant.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
8-10	8-10

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





Black Chokeberry

Aronia melanocarpa

A member of the Rose family, black chokeberry is a deciduous shrub which can grow to a height of 3 to 6 feet tall. Berries (also known as Aronia berries) can be canned whole or the juice extracted for jelly making, as well as healthful fruit drinks. Plants are browsed by white-tailed deer and rabbits. The fruit are eaten by ruffed grouse, sharp-tailed grouse and prairie chickens.

The best growth and fruit production occurs on low moist but well-drained sites, in full sun. It is not drought-tolerant.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
4-8	4-8

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





Chokecherry

Prunus virginiana

Chokecherry is a medium/large-sized shrub that forms a dense thicket from root suckers. It is used for the outer row in multirow windbreaks. Chokecherry is good wildlife habitat, providing food and cover for birds and small mammals. Showy white flowers bloom in April or May, and the cherries ripen during July. The cherries can be used for making jelly and wine.

Chokecherry should not be planted near other stone-fruit species because of western x-disease and black knot. Tent caterpillars are often a problem in the spring but rarely kill the plant.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
6-12	6-12

Suggested Spacing (ft.)

Within Rows:	Between Rows:
6-12	14-30





Common Lilac

Syringa vulgaris

Common lilac is a suckering, upright medium-tall shrub that is best located in the outside row of windbreaks. Fragrant white to lavender flowers bloom during May. Lilac is rarely used in wildlife plantings since it does not form thickets and the seeds have little food value.

Powdery mildew and oystershell scale are common problems.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years: Maturity:

5-8 5-8

Suggested Spacing (ft.)

Within Rows: Between Rows:

4-8 10-20





Elderberry

Sambucus canadensis

Elderberry is a medium-large, semi-wood species native to Nebraska. It is primarily used in wildlife plantings for summer food. The dark purple berries are formed on umbrella-like heads and ripen during mid- to late summer. The berries make excellent jelly and syrups.

Elderberry is susceptible to some winter dieback in the western part of the state.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
4-6	4-6

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





False Indigo

Amorpha fruitcosa

False indigo is a moderately fast growing shrub that is sometimes used for shoreline and riverbank stabilization. It can reach heights of 5 to 20 feet, likes full sun or light shade and thrives in moist soils that are poorly drained. It also performs well on silt loams to dry sands. It prefers sandy soil and is a legume, so it can extract nitrogen from the air and enrich poor soil. False indigo is good for establishing wildlife food and cover on upland sites.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
4-10	4-10

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





Gambel Oak

Quercus gambelli

Gambel Oak provides food and shelter for many wildlife species. It can be found in dense patches.



Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
5-15	15-25

Suggested Spacing (ft.)

Within Rows:	Between Rows:
6-12	14-30



Golden Currant

Ribes aureum

Golden currant is a winter-hardy, drought-tolerant, small, native shrub. On the best sites, it will grow to 5 to 7 feet tall. It has very fragrant yellow flowers during May. The edible fruit is yellowish to purplish black when ripe. The fruit can be eaten directly from the bush or made into jelly. Golden currant is an excellent wildlife habitat species or can be used on the outside row of multirow windbreaks.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
4-6	4-6

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





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Gray Dogwood

Cornus racemosa

The Gray Dogwood is thickly branched and slow growing sometimes producing a rounded shape, seldom reaching more than 6 feet high at maturity. White flowers bloom in May or June and are



followed by white fruit set off by bright red fruit stalks in September and October. Competing vegetation should be controlled, particularly during the first few years after planting.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
4-10	4-10

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20



Highbush Cranberry

Opulus L. var. americanum

Highbush Cranberry, also known as American Cranberrybush, is a rounded shrub that grows at a medium rate, to 8- to 12-feet tall with dark green leaves that turn shades of red, yellow, and purple in autumn. White flowers bloom in spring and are followed by abundant red fruit loved by birds. Although tolerant of most any soil, it prefers moderately fertile, moist but well-drained soil and thrives in full sun to part shade.

Problems: Insects such as aphids, scale insects, weevils, Japanese beetles, mealybugs, and treehoppers are common, while Botrytis, rust, mildews, wood rot, Verticillium wilt, leaf spots, and dieback also occur.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
6-12	6-12

Suggested Spacing (ft.)

Within Rows:	Between Rows:
6-12	14-30





Nanking Cherry

Prunus tomentosa

A winter hardy, moderately fast-growing, medium shrub. Broad spreading, densely twiggy, becoming more open and picturesque with age. Also called Manchu cherry. Edible fruits are dark red and excellent for pies and jellies. Fruit is relished by many songbirds. Provides nesting cover for a few species of songbirds.

Browsed by rabbits, mice, and deer, which

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:

4-7

Maturity:

4-7

Suggested Spacing (ft.)

Within Rows:

4-8

Between Rows:

10-20



could cause serious injury if control measures are not taken. It is sometimes a rather short-lived plant.



Peking Cotoneaster

Cotoneaster acutifolia

Peking cotoneaster is a low to medium-growing shrub introduced from Asia. It has dark, glossy green foliage that turns orange to red during the fall. The berry-like fruit ripens to a dark red or black in early October and persists late into the winter, providing a good winter food source for birds. This is a sturdy shrub for the outside row of windbreaks.

Fireblight of the twigs and stems can be a problem.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
5-8	5-8

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





Redosier Dogwood

Cornus sericea

An open, spreading, multi-stemmed, medium to large shrub for farmstead and field windbreaks, and riparian plantings. Horizontal branches at the base. Fruit and twigs are used by several species of wildlife, such as robins, cedar waxwings, rabbits, and deer. Provides dense cover for

a large number of wildlife species.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
5-10	5-10

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20



Sandcherry

Prunus besseyi

Sandcherry is a low-growing shrub native to western Nebraska. It has showy white flowers in May and produces small, sweet, purplish-black cherries in July. Sandcherry can tolerate hot, dry conditions, and prefers well-drained soils. The cherries are especially good for making jelly or jam.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
2-4	2-4

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20



Serviceberry

Amelanchier alnifolia

Serviceberry, also called Juneberry and Saskatoon, is popular for its good tasting fruit similar to blueberry in its looks and taste. It is a slow growing, mid to tall, thicket forming shrub blooming in late spring. Big game browse on the leaves and twigs while songbirds and upland game savor the fruit.

Leaf spots, rust, and pear slugs can be problematic.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
5-10	5-10

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





Skunkbush Sumac

Rhus trilobata

Skunkbush sumac is native to Nebraska. It can tolerate alkaline and extreme drought conditions. The clusters of berry-like fruit are covered with a soft, dense hair and turn a deep red in late summer, and the shrub has a good fall color. Skunkbush sumac is a good wildlife species, providing food for birds throughout the winter. It can be used on the inside or outside rows of windbreaks. Good fall color.

Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
4-6	4-6

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20





Silver Buffaloberry

Shepherdia argentea

Silver buffaloberry is a native species of western Nebraska. This thorny, thicket-forming, tree-like shrub is drought tolerant and adaptable to alkaline soils. The persistent, fleshy berries provide food for birds during the winter. The tart berries also are used in jellies.



Nebraska Vegetative Zones



■ Native to Zone

■ Non-Native to Zone

■ Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
10-12	10-12

Suggested Spacing (ft.)

Within Rows:	Between Rows:
6-12	14-30



Winterberry Euonymus

Euonymus bungeanus

Winterberry euonymus was introduced from China. It is an excellent species for the inside row of farmstead windbreaks or anywhere fall coloration is desirable. The leaves turn pale yellow to reddish brown, the four-winged fruit is pink, and the seeds are a reddish-pink color. The shrub is used by many songbirds for nesting habitat and, to some extent, for food.



Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
8-14	8-14

Suggested Spacing (ft.)

Within Rows:	Between Rows:
6-12	14-30



Wild Rose

Rosa woodsii

The Wild Rose or Woods' Rose (*Rosa woodsii*) is a superb small native rose that has rose-pink flowers in early June. The bright red hips persist throughout winter, and are eaten by insects, birds, small mammals and large mammals. Requires very little fertilization, pest, disease control and pruning. Offers beautiful foliage, flowers and hips. Drought tolerant, needs little sun and can survive on steep, rocky slopes with little topsoil. Good for naturalized plantings and erosion control. Excellent choice for difficult sites.

Nebraska Vegetative Zones



- Native to Zone
- Non-Native to Zone
- Not Recommended for Zone

Average Height (ft.)

20 Years:	Maturity:
5-6	5-6

Suggested Spacing (ft.)

Within Rows:	Between Rows:
4-8	10-20

