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Growing Conifers from Seed

This NebGuide discusses how to grow conifers from seed, including technical terms, collecting and storing seed, and planting and care of the trees.

Constance A. Harrington, District Extension Forester

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Growing your own conifer trees from seed is fun and gives you the satisfaction of doing it yourself. The pioneers had to be self-reliant. Many of the old trees in Nebraska were started from seeds the pioneers brought with them or ordered from nurseries in the east or Europe. We are fortunate in having nurseries available to supply a wide variety of planting stock. However, many people are still interested in growing their own seedlings. You may want to perpetuate a tree with sentimental value, or to reproduce trees with particularly good characteristics. Propagation from seed also is less expensive than buying trees from a nursery.

Explanation of Terms

Germination is the emergence of the seedling from the seed. Seeds must be mature and the environmental factors must be favorable before germination can take place.

When mature seed is placed under favorable conditions and fails to germinate, it is said to be *dormant*. There are two basic types of dormancy. The first, *seed coat dormancy* or *external dormancy*, is caused by the presence of a hard seed covering or seed coat which prevents water and oxygen from reaching and activating the seed or prevents seed expansion. The second type of dormancy, *embryo dormancy* or *internal dormancy*, is caused by the condition of the seed which prevents germination.

The length of time conifer seeds remain dormant can be reduced or eliminated by a simple seed treatment called stratification. *Stratification* is the process of soaking and chilling seeds prior to sowing. It simulates natural conditions where the seeds would remain all winter on cold wet ground. Seeds will germinate promptly and uniformly after stratification. Unstratified seeds may take up to two years to germinate, if they are able to germinate at all.

Collection and Storage of Seed

Pine

Pine cones should be collected in the fall when the cones begin to crack and open. See *Table I* for specific dates. Place the cones on a dry surface in the sun until they open. The exception to this is jack pine. While some jack pine cones open each year, especially those in full sun, most of the cones require additional heat to open. Jack pine cones will need 2-4 hours in a 150° Fahrenheit oven.

Shake or tumble the cones over a screen to remove the seeds. The wings on the seeds may be removed. Rub the seeds between your hands and blow the wings away. Dewinging is not necessary but will make storage and planting easier when processing large amounts of seed. Scotch pine seeds are delicate and should be handled carefully.

If the seeds are to be stored before stratification, they should be put in clean sealed jars and kept at 35-40° Fahrenheit, a common refrigerator temperature.

Spruce

Spruce cones should be collected when they begin to open in the fall, mid August-October. Dry the cones in the sun until they are fully open and the seeds fall out easily when the cones are shaken, or place in an oven at 100-120° Fahrenheit for 6 to 24 hours. Use a thermometer to check the temperature, as higher temperatures will kill the seeds. Spruce cones often have a high percentage of empty seeds. The empty seed can be separated from the good seed by putting the seeds in ethyl alcohol. The empty seed will float and should be discarded. The seeds can be dewinged and stored by the same methods described for pine.

Cedar and Juniper

Cedar and juniper seed should be collected from September through early December. The berry-like cones are blue when ripe. Rocky Mountain juniper seeds take two years to mature, so do not pick the immature green cones.

Soak the cones in a weak lye solution (one teaspoon of lye per gallon of water) for one or two days, then rinse well with water. If the cones are still sticky, repeat the lye soaking and rinsing. Dry the fruits, then separate the seeds from the pulp by rubbing on a screen. Next soak the seeds and pulp in water. The pulp and empty seeds will float and can be discarded. The good seeds should be stored in the same way as pine seeds.

Stratification

Pine and Spruce

Stratification for pine and spruce is a fairly easy process. The seeds have mild internal dormancy. Soak the seeds in room temperature water for two days (change the water after 24 hours) place in moist sand in a clean plastic bag and store at 35-40° Fahrenheit. The bag should be loosely tied. The length of time needed for stratification is listed in *Table II*.

Cedar and Juniper

The junipers have both internal and seed-coat dormancy. Soaking eastern redcedar seed in a weak solution (1 percent) of citric acid for 4 days before stratification will increase germination. Rinse the seeds well with water before stratifying. Stratify the seed by layering in moist sand or peatmoss in a clean plastic bag and keep it at 35-40° Fahrenheit for 30-120 days.

Rocky Mountain juniper seed should be stratified for six months before planting. Layer the seeds in damp peatmoss in a clean plastic bag. Loosely tie the bag and keep it at 35-40° Fahrenheit for 6 months. Begin stratifying the seed in January and plant in July. The seed will germinate the following spring.

Table I. Cone collection dates.

<i>Species</i>	<i>Pre-ripe cone color</i>	<i>Ripe cone color</i>	<i>When to collect cones¹</i>
Ponderosa Pine	green	brown	August-September
Austrian Pine	yellowish-green	yellowish brown light brown	September-November
Scotch Pine	green	grayish or dull brown or cinnamon brown	September-October
Jack Pine	green	tawny yellow to brown	September
White Pine	green	yellow green to light brown	August-September
Black Hills Spruce	green	light brown	Mid August-September
Colorado Blue Spruce	green tinged with red	shiny light brown	September-October
Eastern Redcedar	green	blue	September-November
Rocky Mountain Juniper	green (with bloom)	blue (with waxy white bloom)	Mid September-Mid December

¹After these dates seed drop begins. Seed may be collected but many cones may be empty, increasing the amount of work required.

Table 2. Stratification and planting instructions.

<i>Species</i>	<i>When to plant</i>	<i>Comments</i>
Ponderosa Pine	Spring	Stratify for 20-30 days before planting.
Austrian Pine	Spring	Stratify for 35-56 days before planting.
Scotch Pine	Spring	Stratify for 30-60 days before planting.
Jack Pine	Spring	No stratification necessary.
White Pine	Spring	Stratify for 30-60 days before planting.
Black Hills Spruce	Spring	Stratify 30-50 days before planting.
Colorado Blue Spruce	Spring	Stratify 30-50 days before planting.
Eastern Redcedar	August or Spring	No stratification needed if planted in August. Stratify 30-120 days before spring planting.
Rocky Mountain Juniper	July	Start stratification in January. Plant in July.

Planting and Care

Seeds should be planted promptly after stratification. If the seed is allowed to dry out, dormancy may be triggered again and your efforts will be wasted.

A large seed bed is not needed for a home operation, but the area should be selected carefully. The area should be well-drained and fairly open, close to a source of water and protected from animals. An acid sandy loam is best for most conifers. The addition of peatmoss will help make the soil more acidic. Add fertilizer to a poor soil. A 4 x 8 foot seedbed would need about half a pound of commercial fertilizer like ammonia nitrate 33% or ammonium phosphate 12-20-0. The fertilizer should be worked into the soil well before planting.

The planting times for the most common conifers grown in Nebraska are given in *Table II*. When planting in the spring, wait until all danger of frost is past.

The best method of seeding is in uniform rows. Space the rows 6 to 8 inches apart, leaving 2 foot walkways about every 6 rows.

An easy method of marking and preparing rows requires a straight piece of 2 x 4 lumber, 12-18 inches long. Press the board edgewise into softened soil to a depth of about 1/2 inch wherever a row is desired. Lifting the board carefully will leave a 1 1/2 inch wide strip. Seed the strip evenly with no more than 50 seeds per foot, then gently press the seeds into the soil with the edge of the board.

Fill the row depression with peat moss until the surface of the row is level with the soil between the rows. Lightly sprinkle the seedbed with water to moisten the peat moss. Peatmoss is best because it keeps the seed surrounded by an acid medium which discourages disease problems.

When eastern redcedar or Rocky Mountain juniper seeds have been planted, the seedbed should be covered with a perforated clear plastic tarp. Keep the seedbed moist. Remove the plastic tarp when the seedlings begin to emerge the next spring.

The most important time for disease control is early in the seedlings' life. Damping-off is a common disease problem in seedbeds. Damping-off fungi can attack the seeds, the emerging seedlings, and the roots of first year seedlings. These attacks are often fatal and can sharply reduce or even eliminate your seedling crop.

A number of fungicides are available from garden stores which will control the problem. Follow the recommendations on the product's label. Some of the fungicides recommend the first spray when 50% of the seedlings have emerged. Others require treatment at the time of planting. All treatments are aimed at prevention; there is no cure.

After the seeds have been planted, the seedbed should be kept moist. If the soil around the seeds dries out, dormancy may be triggered again. When the seedlings begin to emerge, 20-30 days after planting, watering should be stopped. The young seedlings should be watered only when the root zone dries out. The seedbed should be kept well-weeded. If the weeds become too large, you may uproot the young seedlings when weeding.

Pine seedlings grow best in full sun. However, spruce, cedar and juniper do much better under partial shade the first year. Supporting lath strips or snow fence about a foot above the ground on stakes works very well. The wooden strips should run north and south so the shadows will move across the seedbed

during the day. The wood strips and the spaces should take up the same amount of room to provide about 50% shade.

The snow fence should be kept on during the winter to provide protection from winter storms. The pine seedlings should be mulched with straw or leaves 3-4 inches deep during the winter. Remove the mulch in the spring.

You will want to have the seedlings about an inch apart. If too many seedlings come up, thin them out by pulling the excess or cutting them off with shears. The seedlings should stay in the seedbed for 2 or 3 years. The seedlings should be about 6-12 inches tall before they are outplanted. If the seedlings are still not large enough for out-planting, they should be thinned again or transplanted to provide more growing space. If you decide to transplant the seedlings, put them into rows about 8 inches apart with 3 inches between seedlings in the rows.

If you would like to grow some conifers in your home, follow the same procedures for collection, storage and stratification. Garden soil should be sterilized to prevent damping-off problems. Thinly spread the soil on a cookie sheet to a depth of 1/4 inch. Put in the oven at 250° Fahrenheit for at least two hours. Most packaged potting soil mixes have been pretreated and do not need sterilization. Full sun is needed for conifers grown indoors. A south window would be best.

For further information on growing trees from seed consult **Seeds of Woody Plants in the United States**, U.S.D.A. Agriculture Handbook 450. It can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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