



# Growing Evergreen Trees from Seed

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## Selection of Soil and Site

A well drained sand or sandy loam soil that has been cultivated for a year or more should be used for the seed bed. Avoid the use of clay or clay loam soils. The average garden soil should have enough fertility to grow evergreen trees without adding any commercial fertilizer.

The seed bed should be located on well drained, level ground free of shade near a supply of water.

## Size of The Seed Bed

A 12 square foot seed bed will grow about 500 or 600 trees.

A rectangular frame 3' by 4' or 2½' by 5' can be made from scrap lumber using boards 4 inches wide. The frame should be nailed together so the boards will rest on edge. The top of the frame should be covered with ¼" or ½" mesh hardware cloth to prevent birds from damaging the seed bed after the seed is sown.

For ventilation and to prevent loss of seedlings from damping-off disease, it is well to build a second frame the same size to be placed in the ground so the edge of the board will be flush with the surface of the soil. The frame above the ground can then be raised by placing blocks of wood or bricks between the two frames to ventilate the surface of the seed bed.

## Soil Preparation

Spade the soil to a depth of 8 inches, rake and level the surface. Remove all stones, lumps, roots and other trash from the surface soil. If two seed frames are to be used, place one frame in the ground so the edge of the boards will be flush with the surface of the cultivated soil. The loose soil should be firmed a little by placing a wide board flat on the surface, then step on it. This can be repeated until the entire surface of the seed bed is level and firm.

## Time to Sow Seed

Most evergreen tree seed will germinate readily if sown in the spring during May. White pine and white spruce require two or three months of stratification to obtain best germination, therefore, seeds of these species should be sown in the fall during late October or early November.

## Amount of Seed to Sow

For most accurate sowing, a germination test of the seed should be made by sowing 100 seeds in a flat of sand. Count the seedlings that grow to determine the germination per cent. Seventy to 80 good seeds should be sown on each square foot of the seed bed in order to obtain a stand of 50 or 60 trees to the square foot. Seed bed germination is usually a little less than the germination test indicates.

When sowing seed without a germination test use the average percentages or the quantity of seed recommended for each species in the following table.

TABLE 1—AMOUNT OF SEED TO SOW BY SPECIES

Species	Recommended Use: 1. Ornamental 2. Timber production 3. Christmas trees 4. Pulpwood 5. Windbreaks	Average number clean seeds per lb.	Average germination percentage	Amount of seed to sow in 12 square feet	
				Ounce	Level tsp.
White spruce, <i>Picea glauca</i>	1,3,4,5	240,000	25-45	.13	2
Blue spruce, <i>Picea pungens</i>	1,3	106,000	73	.20	2
Norway spruce, <i>Picea abies</i>	1,3,4,5	64,000	75	.34	3
Red pine, <i>Pinus resinosa</i>	1,2,3,4,5	52,000	75	.39	3½

## Sowing Seed

After the soil has been properly prepared and seed bed frame placed, the seed should be sown evenly over the surface of the soil. A hand seeder can be easily made by punching holes (from the inside out) with a nail in the metal top of a glass jar. The holes should permit the seed to sift through freely when shaking the jar.

Hold the jar of seed 6 to 10 inches above the soil and broadcast evenly by sifting both lengthwise and crosswise over the bed. The seed should then be covered with ⅛ to ¼ inch of sterile sand taken from a depth of 18 inches or more below the surface so it will be free of weed seeds and plant diseases commonly found in surface soil. The smallest seeds, white spruce, blue spruce and jack pine, should be covered ⅛ inch deep; while larger seeds of the other species will germinate readily through ¼ inch of sand.

A sand sifter made of 4 inch boards nailed together to form a frame 18 inches square with  $\frac{1}{4}$  inch mesh hardware cloth (for most sand) stapled to the bottom of the frame can be used to clean the sand and cover the seed to an even depth. After the seed has been covered, a piece of clean burlap pre-soaked several hours in water should be placed on the surface of the seed bed. It will serve as a good winter mulch for fall sown seed, and it will prevent the sand from washing off the seed by hard rains. As soon as the seed begins to germinate (about two weeks) the burlap should be removed and a hardware cloth cover put over the frame to prevent birds from pulling the seedlings.

When most of the seedlings have germinated and the seed coats have fallen off the tips of the seedlings, the hardware cloth can be replaced with lath shade. A short piece of snow fence or lath nailed to two narrow boards with a space between each lath equal to the width of a lath will make satisfactory shade.

### Watering

The surface soil should be kept moist until the seedlings begin to germinate. After germination starts less water is needed. If rains are frequent, little or no watering is needed. During dry weather a good watering once a week is better than several light sprinkles. Three gallons of water applied with a sprinkling can should moisten the soil to a depth of two or three inches. Excess moisture will create favorable conditions for damping-off disease. Watering in the middle of the day is preferred so the soil will dry by evening.

### Damping-Off Control

Damping-off is a fungus disease that withers the stem of the seedling at the ground line. Seedlings are most susceptible to this disease during the first six weeks after germination. Humid weather promotes damping-off. During such weather remove the shade and raise the seed bed frame to let air circulate freely over the surface of the soil.

Fungicides to reduce the development of damping-off disease are now available. *Captan* and *Thiram* suspended in water and applied as a drench gave good control of damping-off in the Tree Research Nursery at M.S.U. Two grams or two level teaspoons of either chemical should be suspended in one gallon of water by vigorous stirring, then sprinkled immediately over the seed bed. Three applications at ten day intervals starting before germination are usually sufficient to control the disease.

### Weed Control

Chemical weeding or soil fumigation is the modern way of controlling weeds in forest tree nurseries. Many soil fumigation chemicals are on the market but not all of them are safe to use in soils before evergreen tree seeds are sown. The chemicals used most extensively in nurseries at the present time are Methyl Bromide Gas, Mylon and Vapam. Methyl Bromide Gas must be applied under a plastic cover; the fumes are extremely dangerous to humans. Mylon and Vapam are easier to apply and

not as dangerous as Methyl Bromide. These are all strong chemicals so the fumes should not be inhaled. Follow the directions on the package carefully when applying these chemicals. Crag Mylon 50D is a granular material that should be spread over the surface of the prepared seed bed at the rate of two ounces on 12 square feet. Water the chemical into the soil immediately with three gallons of water. Avoid breathing the fumes as the chemical dissolves. Do not sow seed for at least three weeks after treatment.

Vapam is a liquid, dilute one-fourth of a pint in one gallon of water and sprinkle evenly over the surface of the seed bed. Water it into the soil with an additional two gallons of water. Avoid breathing the fumes while sprinkling Vapam on the seed bed and watering it in. Do not sow seeds for at least three weeks after the chemical is applied. These chemicals kill all kinds of seeds so it is necessary to wait until they are dissipated before evergreen tree seed can be sown with safety.

The soil can be treated with one of these fumigants in the fall during October when the soil temperature is 65° or higher. For spring seeding there is then no danger of chemical damage to the seed. If the soil is not fumigated, the weeds should be pulled every week while they are small so as not to disturb the seedling roots.

Stoddard Solvent or mineral spirits is used in large nurseries to kill small weeds. This oil should be applied as a mist with a power sprayer at the rate of 25 gallons per acre. It is not practical for the small seed bed owner to use. Heavy applications or drops of oil on the seedlings might brown the needles.

### Fall and Winter Care

The shade frame should be removed by the first of September.

Very little, if any, watering is needed during the fall months. Only when the ground is dry and the weather is warm should the seed bed be watered.

In late November the seed bed should be mulched with  $\frac{1}{2}$  to  $\frac{3}{4}$  inch of sawdust or an inch or two covering of long clean straw spread over the trees. Sawdust is the best mulching material to use because it will help retain soil moisture and will reduce weeding to some extent the second year.

### Future Management

If straw is used as a mulch remove it the middle of April or before new growth starts. Pull weeds all during the summer. When the weather is dry soak the soil once a week with five or six gallons of water.

Two-year old pine seedlings are usually large enough for field planting. Spruce seedlings should be left in the seed bed another year or lined-out in rows two or three inches apart. The row spacing should be a convenient width for cultivation. If all work is to be done by hand six to eight inch spacing of rows is satisfactory. Shallow cultivation should be practiced so as not to damage the tree roots. The trees can be left in the lining-out rows for one or two years, depending on the size desired for field planting.