

# 4-H Forestry Project No. 5

## *Forest Nurseries*



Tree planting is a familiar forestry practice for many Mississippians, but have you ever wondered where those seedlings come from? They are grown in a forest tree nursery under the watchful eye of a nursery forester who does everything necessary to produce a strong, healthy crop of seedlings. The forester must pay close attention to soil fertility, irrigation, pests, and many other things. No matter their knowledge, however, a nursery manager is always learning. Many aspects of soil management, pest control, and tree growth are best learned by experience, and that's one reason making and operating a small forest nursery is a good 4-H activity.

As a 4-H'er involved in forest nursery work, you will learn how to collect and sow tree seeds, prepare seedbeds for planting, manage soil fertility, and identify and control pests. You will also discover ways different tree species sprout and grow. In addition, when your project is finished, you'll have many tree seedlings to use for planting. Tree seedlings are valuable for windbreaks, hedgerows, cover for wildlife, city beautification, and many other purposes. Developing and operating your forest nursery will increase your knowledge and skill in resource management.

### **Project References**

1. "Growing Your Own Oak Seedlings," Extension Publication 2421.
2. "Collecting and Identifying Tree Seeds," Extension Publication 1422.
3. "Seeds of Woody Plants in North America," 1992. Discordes Press. Portland, Oregon. A07p.

### **Project Materials**

1. A 4-foot by 10-foot garden plot
2. Hose or watering can
3. Shovel, rake, hoe, and assorted garden tools
4. Pine straw
5. Small trash can or coffee can
6. Notebook

### **Sources of Help and Information**

1. County Extension agents
2. Area forester, Mississippi Forestry Commission
3. District Conservationist, Natural Resources Conservation Service, U.S. Department of Agriculture
4. District ranger, Forest Service, U.S. Department of Agriculture
5. Foresters with local forest industries
6. Consulting foresters, self-employed

### **Instructions**

#### ***Your Nursery***

If you have a garden, you already have a nursery. Growing purple hull peas from seed is not much different from growing pine trees. If you don't have a garden, a flower bed will do, or you can start a new place. Wherever you decide to grow your seedlings, choose an area with good drainage and full sun. A sandy loam soil with a pH about 6.0 is best, but almost any soil will do. Get your soil tested before you start; work some organic matter into the soil when you prepare the beds. Rotted cow manure or leaves are good sources of organic matter. Your county Extension agent can show you how to test your soil.

#### ***Seed Collection and Handling***

You can grow almost any tree species you desire in your nursery. Many different kinds of seed are available, and you can learn a lot from each one because each has its own set of species-specific needs. This is especially true for hardwoods, which must be treated a particular way to be sure seedlings grow. Some seed have hard coats that must be cracked or scratched. Others need no treatment at all.

Since there are some differences in the way seeds must be handled, let's discuss pine trees as an example. If you want to grow another tree species, you can get information about it from the **Project References** or other **Sources of Help and Information**.

You cannot grow pine trees by planting pine cones. Pine seed are contained within cones and must be taken out before planting. Collect ripe pine cones in the fall before they open, because most seed are shed soon afterward. Cone color is one way to judge ripeness. Loblolly pine cones are green when immature, but ripe cones range from green to shiny light brown to dull, pale, reddish brown.

You can collect cones from standing trees or trees that have been recently cut down. Thirty-five loblolly pine cones, for example, yield between .6 and 1.3 pounds of seed, and 1 pound of loblolly seed usually contains about 18,000 seed. Of those, typically, about 60 percent may become seedlings you can plant — that's 10,800 seedlings per pound of loblolly pine seed.

Most 4-H'ers will not need that many seedlings, so collect only about 10 to 15 cones. A good way to collect pine seed is to contact a local logger when cones begin to ripen. Tell the logger you would like to collect some seed and ask if their company is cutting stands currently. If so, ask permission to go to the logging job and collect cones from the tops of harvested pine trees. Pick the best trees to get cones, and take only large, healthy cones free of insect

or other damage. If you would rather not collect your own seed, some commercial companies sell seed.

Collect cones in a burlap bag. Do not use plastic bags, because they hold heat given off by cones, and seeds may be damaged. When you get home, spread the cones out on a tray in the sun or in a well ventilated room to dry and open. Loblolly pine cones should open in 3 to 7 days.

After the cones open, shake them to remove the seed. You can process small lots by shaking a few cones at a time into a small trash can or coffee can. When the seed have been removed from the cones, they will have a papery wing you can remove easily by rubbing them between your hands. This step is important so that you can determine seed quality. You can separate good seed from bad by pouring the seed lot into water. Seed that are bad will float and should be discarded. Dry sound seed just enough so that seed surfaces are dry and the seed flow when poured out. Now your seed lot is ready to sow.

### ***Satisfying the Seed's Needs***

Seed of many tree species have mechanisms to ensure that they germinate at a time of year when they have the best chance survival. Tree growth begins in springtime, but pine trees release seed in the fall. How does a pine seed know when it's spring? It "knows" it's spring when its dormancy period is over. Dormancy is a rest state in which seeds remain until proper conditions for germination are met.

Pine seed are dormant between seed fall and germination. Inside the seed, preventative chemicals keep it from growing until a certain period of cold, moist storage, called "stratification," has passed. This prevents seed from germinating in warm weather, when they would be killed by subsequent winter frosts.

Seed have to experience stratification in order to germinate and produce pine seedlings. If you plant in the fall, seed are stratified naturally and germinate the next spring. For loblolly pine, mix seed with moist sand; place the mixture in plastic bags, and store at 33 to 41 degrees Fahrenheit for 30 to 60 days to overcome dormancy before you plant.

### ***Into the Ground***

Prepare your seedbeds in the fall. Use a shovel and rake or a garden tiller to break the soil to form 4-foot-wide beds (Figure 1). When the beds are ready, plant loblolly pine seed in rows about 6 inches apart with one-half of an inch between seeds in a row. As an alternate pattern of seedbed preparation, you may arrange your plantings in small, separate blocks along your nursery beds (Figure 2).

This arrangement could be useful when it is time to lift seedlings. Press seed into the soil surface firmly and cover them with pine straw. Ideally the seedbed needs about 25 seedlings per square foot to produce plantable seedlings. Arranged that way, a bed 4 feet wide and 100 feet long produces 5,000 seedlings.

Count your seed as you sow them and record in your notebook the number you planted. Keep notes on everything you do in your nursery. Record the date and what you did (water, weed, fertilize, plant) each time you visit your nursery. It will take about 30 days for planted seed to germinate. During this period, count the number of sprouts

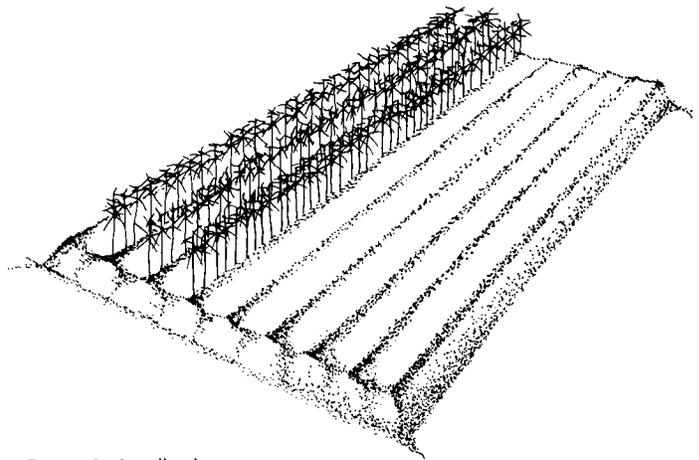


Figure 1. Seedbed

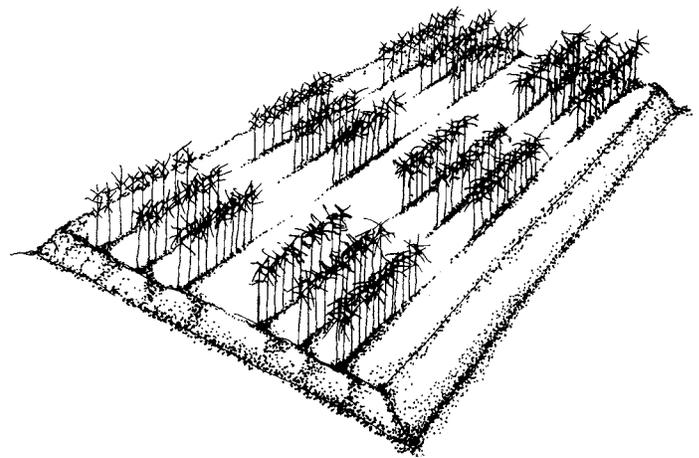


Figure 2. Small block plantings

that appear each time you visit the nursery. By doing these counts, you will be able to check how many of the seed you plant germinate and become healthy, plantable seedlings.

### ***Cultural Needs***

Unfortunately, you cannot put seed in the ground, walk away, and expect to return a year later and find a bed of good-quality seedlings. However, it is not necessary to tend your seedlings every day. Once each week, check your beds for weeds, moisture, insects, and disease. Weeding is important in tree nurseries. Keep your beds clean so seedlings can grow without competition. When weeds remain in seedbeds, they capture vital moisture and nutrients needed by seedlings. In addition, they can provide cover for harmful insects. Keeping nursery beds free of weeds is a basic nursery need.

Watering is a must for tree seedlings, especially during germination in the spring. Control of available water is important when growing young plants. By choosing a well-drained soil, you can avoid seedbeds that stay too wet.

Water your seedbeds to bring soil moisture content of the upper 8 inches to "field capacity." (Field capacity is the full amount of water the soil can hold.) Many nursery managers calculate their watering needs by assuming nursery seedlings require 1 inch or more of water per week. When rainfall doesn't supply the needed moisture, seedbeds are watered to maintain standard.

When watering seedbeds, remember that heavy, infrequent watering is more effective than light, frequent watering. So, plan to provide one thorough drenching per week, unless temperatures are unusually high or rainfall is adequate. Also, the best time to water is evening or early morning. When seedbeds are watered in the heat of the day, much of water is lost to evaporation. Controlling insects and disease is also important. If you keep nursery beds free of weeds, you are well on your way to insect and disease prevention. You may encounter many insect and disease problems. The best way is to keep your beds weeded and evenly moist and consult your county Extension agent or a forester if any specific problems arise.

Count how many seedlings you've grown, and record the number in your notebook. When you are ready, dig your seedlings carefully, protecting the roots as much as possible. Remove excess soil so you can bundle your "bare root" seedlings. Be careful to protect roots from drying sun or wind. Put some moist peat moss or wood shavings around tree roots and package them in plastic bags or burlap. Tie your seedling bundles together with string so you have easy to handle packages.

***Lifting and Packaging***

At the end of the growing season (typically December in Mississippi), seedlings stop growing for the winter. Once seedlings are dormant, you can safely transplant them. Commercial nurseries dig their seedlings in late autumn, package them, and store them in large, refrigerated rooms until they are needed. If you cannot store your seedlings this way, let them stay in the nursery bed. You can "store" them in the ground until you need them.

**4-H Forestry Project Record No. 5**  
***Forest Nurseries***

Your full name \_\_\_\_\_

Your age \_\_\_\_\_ Grade in school \_\_\_\_\_ Number of years in 4-H \_\_\_\_\_

Your county \_\_\_\_\_ Date of birth \_\_\_\_\_

Your parent's name \_\_\_\_\_

Your address \_\_\_\_\_

Adult leader's name \_\_\_\_\_

1. How many species of trees did you plant? \_\_\_\_\_

Species	Number of seed planted	Number sprouted after 20 days	Number of seedlings at end of season
Example: Loblolly Pine	400	450	329

2. List the different species you planted and the number of seed of each species.

3. What date did you plant your seed? \_\_\_\_\_

4. Where did you get the seed you planted? List species and location.

Species	Location of seed source
Example: Black walnut	Grandfather's farm 2 miles east of Sturgis

5. What problems (insects, disease, animals, birds) did you encounter while growing your seedling? What did you learn about the problem? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
6. What was your greatest nursery success? \_\_\_\_\_  
 Why? \_\_\_\_\_  
 \_\_\_\_\_
7. What was your worst nursery failure? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
8. What sources of information did you consult for help? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
9. Did you use your nursery as a demonstration and show other 4-H'ers or 4-H leaders? \_\_\_\_\_  
 If no, why not? \_\_\_\_\_  
 \_\_\_\_\_
10. What did you like best about this project? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
11. Write down any suggestions you have on how to improve this project. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
12. How do you plan to use your tree seedlings? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

As an adult 4-H leader, I have checked this Forest Nurseries Project Record and found it is completed satisfactorily.

\_\_\_\_\_  
 4-H leader's signature

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