

4-H Forestry Project No. 5

Forest Nurseries

Tree planting is a familiar forestry practice to many Mississippians. 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 pine or hardwood seedlings. The forester must pay close attention to soil fertility, irrigation, pests, and many other things.

No matter how much is known, however, a forest tree 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 the 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 and 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. "Home-Grown Pines," Mississippi State University Extension Service, MTN 1K.
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 agent or 4-H youth agent, Mississippi State University Extension Service
2. County forester, Mississippi Forestry Commission
3. District conservationist, Natural Resource 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 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 “personality.” Personality means that many tree species, especially hardwoods, must be treated a particular way to be sure the 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 seed must be handled, let’s discuss pine trees as an example. If you want to grow another tree species, you can get information about its “personality” 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 the 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, will yield between .6 and 1.3 pounds of seed, and 1 pound of loblolly seed usually contains about 18,000 seed. Of those, about 60 percent can be expected to become seedlings you can plant — that’s 10,900 seedlings per pound of loblolly pine seed.

Most 4-H’ers will not need that many seedlings, so collect only about 20 to 25 cones. A good way to collect pine seed is to contact a local logger when the cones begin to ripen; tell the logger you would like to collect some seed. Ask if the logging company is cutting any stands of the tree species you want. 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 your cones and take only the large, healthy cones that are free of insect or other damage. If you would rather not collect your own seed, some commercial companies offer seed for sale.

Collect cones in a burlap bag. Do not use plastic bags because they hold the heat given off by the cones and the seed 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. The 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 hand rubbing. You can separate loblolly pine seed from full ones by

pouring the seed lot into water. Seed that float are empty; throw them away. Dry the sound seed just enough so the seed surfaces are dry and the seed flow when poured out. Now your seed lot is ready to sow.

Satisfying the Seed’s Needs

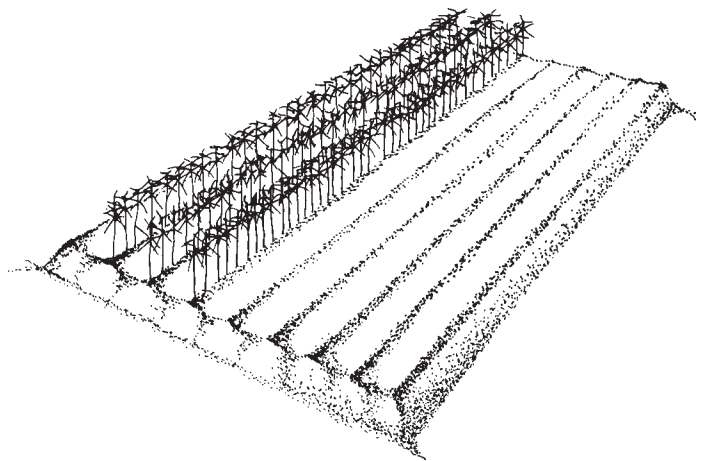
Seed of many tree species have ways to be sure the seed germinate at a time of year when they will have the best chance to survive. A good time of year to begin growth, if you’re a seed, is springtime, but pine trees release their seed in the fall. How does a pine seed know when it’s spring? It “knows” it’s spring when its dormancy period is over. Dormancy is a rest state in which the seed will remain until proper conditions for germination occur.

Pine seed exhibit dormancy during the time between seed fall and germination. Inside the seed, certain chemicals prevent the seed from growing until seed experience a certain period of cold, moist storage, called “stratification.” This prevents seed from germinating in warm weather in November or December when they would surely be killed by winter frosts.

This “cold requirement” must be satisfied to produce pine seedlings. If you plant in the fall, the seed are stratified naturally and will germinate the following spring. If spring planting is necessary, mix loblolly pine seed with moist sand; place the mix in plastic bags and store at 33 to 41 degrees Fahrenheit for 30 to 60 days to overcome dormancy before you plant.

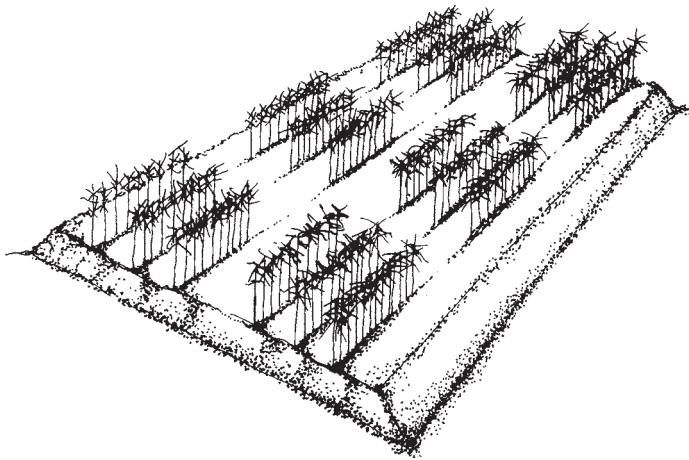
Into the Ground

Prepare your seedbeds in the fall whether you plan



to sow then or the following spring. Use a shovel and rake or a rototiller to break the soil to form 4-foot-wide beds (Figure 1). When the beds are ready, plant loblolly pine seed in rows that are about 6 inches apart, with one-half of an inch between seed in a row.

Figure 1. Seedbed



As an alternate pattern of seedbed preparation, you may arrange your plantings in small, separate blocks along your nursery beds (Figure 2).

Figure 2. Small block plantings

This arrangement could be useful when lifting time comes. Press the 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. For about 30 days after you plant your nursery, the seed will be germinating. In this period, count the number of sprouts that have appeared each time you visit the nursery. By doing these counts, you will be able to check how many of the seed you planted finally become healthy, plantable seedlings.

Cultural Needs

Unfortunately, you cannot put the 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 attend to your seedlings every day either. Once each week check your beds for weeds, moisture, insects, and disease. Weeding is important in tree nurseries. Keep your beds clean so the seedlings can grow without competition. When weeds remain in the seedbeds, they rob the seedlings of vital moisture and nutrients and 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 at the start, you can avoid seedbeds that stay too wet, and by watering when necessary, you provide the required moisture.

Water your seedbeds to bring the 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 that nursery seedlings require 1 inch or more of water per week. When rainfall doesn’t supply the needed moisture, the seedbeds are watered to maintain the standard.

When watering your seedbeds, remember that heavy, infrequent watering is more effective than light, frequent watering. So, plan to give about one thorough drenching per week, unless the temperatures are unusually high or rainfall is adequate. Also, the best times to water are evening or early morning. When seedbeds are watered in the heat of the day, much of the 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. To list them is not particularly useful. The best way is to keep your beds weeded and evenly moist and consult your county Extension agent or forester if any specific problems arise.

Lifting and Packaging

At the end of the growing season, the seedlings stop growing for the winter; this usually occurs by December in Mississippi. Once seedlings are dormant, you can safely transplant them. Commercial nurseries dig their trees in late autumn, package them, and store them in large, refrigerated rooms until the seedlings 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.

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 the roots from drying sun or wind. Put some moist peat moss or wood shavings around the tree roots and package them in plastic bags or burlap. Tie your seedling bundles together with string so you have packages easy to handle.

Growing tree seedlings is an enjoyable way to learn about trees and forestry. After your first successful season of tree nursery work, you may want to grow some



4-H Forestry Project Record No. 5

Forest Nurseries

Your full name _____ Your age _____

Grade in school _____ Number of years in 4-H _____ Date of birth _____

Your parent's name _____

Your address _____

Adult leader's name _____

Your county _____

1. How many species of trees did you plant? _____

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

Species	Number of seed planted	Number sprouted after 20 days	Number of seedlings at end of season
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Example:

Loblolly pine	400	350	329
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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
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Example:

Black walnut	Grandfather's farm 2 miles east of Sturgis
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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. Where are the Mississippi Forestry Commission Forest Tree Nurseries? _____

10. Have you visited any of these nurseries? _____

11. Did you use your nursery as a demonstration and show other 4-H'ers or 4-H leaders?

If no, why not? _____

12. What did you like best about this project? _____

13. Write down any suggestions you have on how to improve this project. _____

14. 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

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Publication 1408

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. RONALD A. BROWN, Director

(rev-750-10-98)

