

Storing, Handling and Planting Southern Pine Seedlings

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FRAGILE – HANDLE WITH CARE. This message is frequently written on packages shipped through the mail. It points out that the contents of the package can be easily destroyed by rough handling.

Pine seedlings should carry this label as well. They are fragile. Many landowners spend large sums of money on site preparation and planting pine seedlings, only to see many of the seedlings die. There can, of course, be many causes for poor seedling survival. However, two of the most common causes are improper handling and improper planting. The following information is provided to help landowners and tree planters properly care for pine seedlings during planting operations.

Seedling Care

Most seedlings will be packed in moist bundles, bags or boxes at the nursery and can be kept in these shipping containers for several weeks, **if they are handled properly.** Store them in a cool, dry place, protected from the sun and wind, and keep them from freezing. If seedlings are in open-ended bundles, stack the bundles loosely to allow air circulation and water them thoroughly every other day. After watering, restack the bundles with one end slightly raised to ensure proper drainage.

Under ideal conditions, pine seedlings should be stored in a cooler facility until a day or two before they are planted. If it becomes necessary to store seedlings for more than a

week, they should be returned to a cooler facility. When it is not possible to return seedlings to a cooler facility, storage in any cool (but above freezing), stable environment will improve survival.

Planting the Seedlings

At the planting site, store seedlings in the shade. Remember, the area under shade changes as the sun moves through the sky. When the planting operation begins, remove from the container only those seedlings that can be immediately placed in a tree-planting bucket or bag. Roots of seedlings left in the containers must remain covered to keep them from drying.

The seedlings that are to be planted should be carried in a tree-planting bucket or bag. Many modern tree nurseries coat seedling roots with a gel to prevent the roots from drying. If the roots are not coated with gel, cover the roots with



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damp peat moss or a mud slurry to protect them from drying. Remove seedlings **one at a time** for planting as each hole is dug. It is extremely important to keep the roots from drying. Do not remove a seedling from the tree-planting bucket or bag until after the planting hole has been opened. **If the roots are allowed to dry, the seedling will die.**

Seedlings can be planted by hand using a dibble bar, spade, mattock or hoe. They can also be planted by machine. Regardless of the method, the object is to plant seedlings deeply enough to keep the seedling from toppling and to keep the roots in firm contact with moist soil.

Foresters have had a long-running debate about how deeply seedlings should be planted and the importance of keeping tap roots straight. Some foresters contend that a seedling's root collar should be planted no more than an inch or two below the soil surface, while others contend that the root collar should be planted four to six inches below. Some foresters contend that a bent tap root is a death sentence for a seedling, while others contend that a bent tap root is of no consequence if the seedling is planted deeply enough to keep the roots moist. Recent research tends to support the latter view.

Good seedling survival starts with a deep planting hole. When using a dibble bar, make sure the blade is at least 10 inches long. Also, make sure to push the blade all the way into the soil before opening the planting hole. Push the seedling into the planting hole until the root collar is about 4 inches below the soil surface (see Figure 1). Straighten the seedling, **firmly close the bottom of the planting hole** and then firmly close the top of the planting hole. Air pockets around the roots at the bottom of the planting hole will allow the roots to dry and will kill the seedling. When machine planting, make sure the shoe of the mechanical planter goes at least 10 inches into the soil. Also, when machine planting on hilly terrain, plant along the contour to minimize soil erosion.

Seedling roots normally should not be pruned. If the seedling has a large root system, open a larger planting hole. Care should be taken to assure that seedlings with long tap roots are pushed far enough into the planting hole. Do not beat the seedlings against a tree or truck bumper to loosen attached soil or the protective clay mixture. This is unnecessary and will damage the seedling roots.

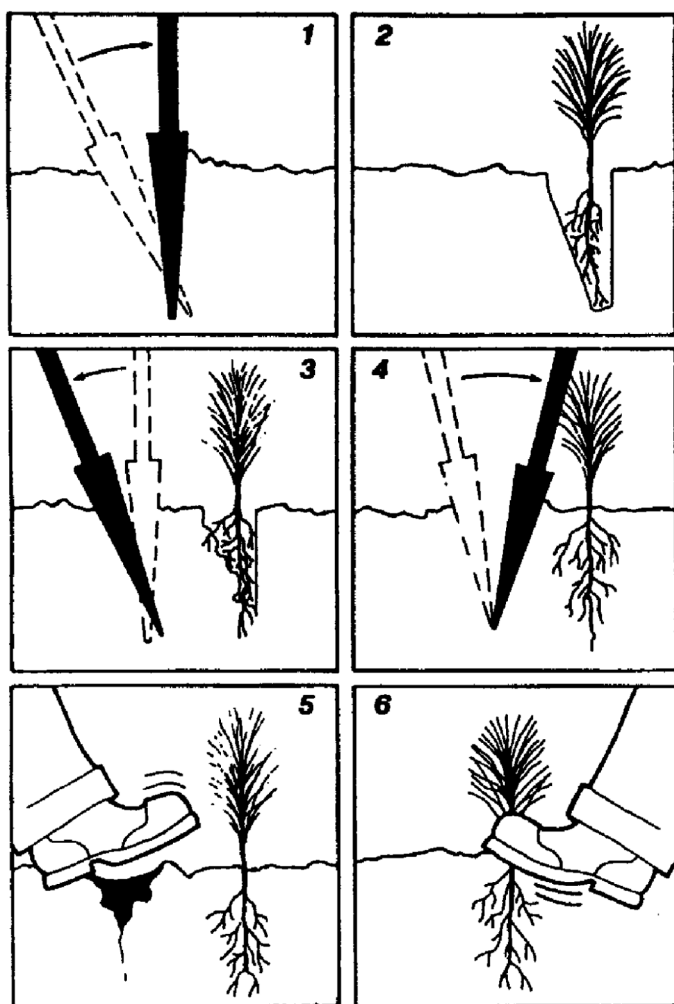


Figure 1. Planting Seedlings With a Dibble

1. Insert dibble into soil at the angle shown and push forward to an upright position.
2. Remove dibble and place seedling in the hole. Push seedling root collar 4 inches below the surface.
3. Push dibble straight down 4 inches behind seedling to depth of blade and pull handle back to close bottom of hole.
4. Push handle forward to close top of hole.
5. Fill in last hole by stamping with heel.
6. Firm soil around seedling using hand or foot. Be careful not to damage seedling.

When to Plant

Pine seedlings are planted in Arkansas from December through mid-March. Most seedlings are planted in February. If the soil is extremely dry, planting should be delayed until after adequate rain has fallen.

Freezing weather can also reduce initial seedling survival. If seedling roots freeze during storage, during the planting operation or in the soil within ten days after planting, high seedling mortality may result. When the temperature drops below freezing, planting operations should be stopped. Seedlings should be protected from freezing until operations can resume. Also, frost heaving on clay soils may occur in the northern part of Arkansas. Planting should be postponed until the danger from severe freezing weather is past.

Number of Seedlings Per Acre

Seedling spacing will determine the number of seedlings per acre that must be ordered. Most forest plantings in Arkansas have from 400 to 700 trees per acre. Between 400 and 500 well-planted seedlings is usually adequate. The table below presents some common tree spacings and the resulting number of trees per acre.

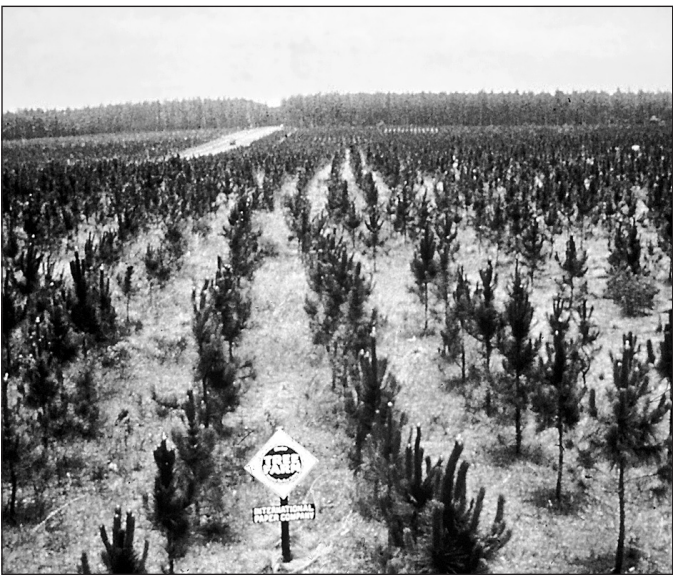
Spacing in feet	Trees per acre
8 x 8	680
8 x 9	600
8 x 10	545
10 x 10	435
9 x 12	400

Keep in mind that placing rows 10 to 12 feet apart will allow access for fire-fighting and harvesting equipment in the future.

Evaluating Seedling Survival

After planting, check seedling survival to determine whether planting was successful. Check the survival of the seedlings within one year after planting. It is important to check survival within one year so that bare areas can be replanted before surviving trees get too large.

A number of sampling schemes can be used to check seedling survival. This paragraph offers a simple scheme. A few months after the seedlings are planted, walk through the plantation. Stop occasionally and count the number of live seedlings out of a strip of 10 in the row of trees. Approximately 20 strips of seedlings spread evenly through the



plantation should be counted. For large plantations more strips should be counted to provide an accurate estimate of seedling survival. While walking through the plantation, be sure to watch for any areas with large numbers of dead seedlings.

Calculate the percent seedling survival for the plantation and multiply this figure by the number of trees initially planted per acre. If there are at least 300 to 400 live seedlings per acre and these seedlings are well distributed across the plantation, replanting is not necessary. If there are fewer than 300 per acre, then the plantation needs to be replanted to obtain adequate stocking. Even if the plantation as a whole is adequately stocked, any significant part of the plantation with fewer than 300 seedlings per acre may need replanting.

Order Seedlings Early

Although trees are normally planted during the winter months, seedlings should be ordered early to ensure an adequate supply. If ordering is delayed, seedlings are less likely to be found. Tree seedlings can be obtained from several sources in Arkansas. Species usually available include shortleaf pine, loblolly pine, most of the major oak species and most of the major bottomland hardwood species. Prices range from \$40 to \$400 per 1,000 pine seedlings and from \$200 to \$600 per 1,000 hardwood seedlings.

You may wish to contact one or more of the following seedling sources:

Arkansas Forestry Commission
3821 W. Roosevelt Road
Little Rock, AR 72204
(501) 296-1940
www.forestry.state.ar.us
Pine and hardwood seedlings
Orders accepted beginning July 1

ArborGen
Fred C. Gragg SuperTree Nursery
191 Nevada 420
Bluff City, AR 71722
(800) 222-1270
www.arborgen.us
Pine and hardwood seedlings
Orders accepted any time of year

Weyerhaeuser Company
Magnolia Nursery
2960 Columbia 11 East
Magnolia, AR 71753
(800) 736-9330
www.weyerhaeuser.com
Pine and hardwood seedlings
Orders accepted any time of year

Delta View Nursery
Route 1, Box 28
Leland, MS 38756
(800) 748-9018
www.deltaviewnursery.com/
Hardwood seedlings
Orders accepted beginning in January

References

- Londo, Andrew J., and Stephen G. Dicke. 2006. *Measuring Survival and Planting Quality in New Pine Plantations*. Southern Regional Extension Forestry. SREF-FM-001.
- South, David B. 2005. *A Review of the "Pull-Up" and "Leave-Down" Methods of Planting Loblolly Pine*. Tree Planters' Notes. 51(1):53-67

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