

SEEDLINGS AND TRANSPLANTS

Bonnie L. Appleton and Deborah B. Hill

The health and quality of seedlings are essential for the production of premium quality Christmas trees. Most plant material is obtained through state forest nurseries or private commercial nurseries. However, you can also grow your own, either in beds or in containers.

However you acquire seedlings, you want to get disease and insect-free, vigorous, healthy plants of uniform size. Look for well-developed terminal buds on leaders and lateral branches (if any) plus a well-branched root system that has white tips to indicate continuing root growth.



(L to R) Scots, white and Virginia pine seedlings

Field-grown seedlings and transplants are categorized and labeled by age. A 2-0 plant is a **seedling** which has grown for two years in the same location from seed. A 2-1 plant is a **transplant** which has grown for two years in one bed (from seed) and then has been moved to another bed for another year's growth. It is actually 3 years old.

For some species, the transplanting process makes the plants more vigorous. Transplanting is not common with pines, but is common with spruces, true firs and Douglas-fir. White and Scots pine are normally 2-0 stock from nurseries; Virginia pine grows rapidly enough that 1-0 stock is large enough to ship for planting. Age alone is no indicator of quality because production techniques and conditions vary, but spruces and firs should probably be no younger than 3 years old (either 3-0 or 2-1 stock).

Seedlings can be purchased from the Kentucky Division of Forestry nurseries, or from private commercial nurseries specializing in seedling or transplant production. If you order from a commercial nursery, select nurseries from neighboring states or



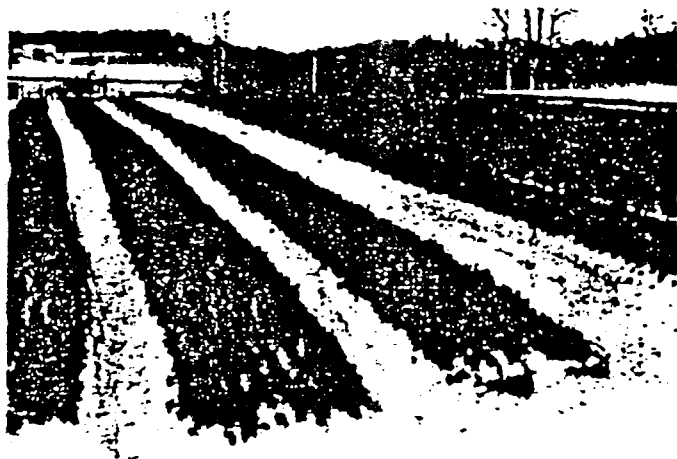
Seedlings ready for shipping

a state like Pennsylvania, which has growing conditions similar enough to those of Kentucky. Seedlings from these states will adapt well to Kentucky's climate (mainly temperature). Ordering from states further north may cause problems with summer heat tolerance and may prevent you from planting during Kentucky's mid-spring planting season because the stock can't be lifted from still-frozen ground in the north. Similar problems can occur when you order material from farther south. The seedlings may already have broken dormancy by the time you could plant here, and the seedlings may not be sufficiently cold tolerant for Kentucky's winters.

When considering plant sources, compare quality with price before placing an order. Good information on seed sources is available through nurseries or through Christmas tree publications (see FOR-34 *References* for more information). If you want to grow quality trees, it is worth your while to familiarize yourself with the characteristics of different seed sources, particularly for Scots and Virginia pine, since these two species are highly variable. Stock from state nurseries is definitely the least expensive, and these nurseries work to improve the genetics of the species they have available. You may, however, get greater consistency in planting stock from private commercial nurseries. Also, the state nurseries do not carry stock of Douglas-fir, spruces or true firs.

Field-grown seedlings and transplants

Most nurseries, including the state nurseries, grow seedlings in large beds, using a process similar to that for starting tobacco. At the KDF Morgan County Nursery, for example, the sandy loam soil in raised beds is fumigated with methyl bromide to destroy any fungal spores or bacteria before the seed is sown. Some fertilizer is incorporated into the soil before seeding, since these beds are used repeatedly and lose nutrients every year. The seeds



Two-year old pine seedlings in the ground

are then broadcast on the beds and covered with straw and/or an open-work netting to prevent the seeds from washing or blowing away. The beds are kept weed-free and adequately watered for two growing seasons.

The seedlings are root-pruned from below when they are lifted and bundled in the field for later counting and packing. All these seedlings are shipped bare-root, but are sprayed with a hydrogel before final packing. Nurseries produce millions of seedlings this way, but you could produce the thousands you need for your own plantation by a similar method. FOR-34 lists places to obtain seeds as well as seedlings.



Lifting seedlings at the nursery



Bundling trees that have been lifted

Container-grown seedlings

Not all seedlings are field-grown and shipped bare-root. Many more, especially spruces and firs, are now grown in containers. Although container-grown seedlings are more expensive to purchase, you can obtain bigger, more uniform seedlings more quickly. Since containerized stock comes with a "plug" of soil around the seedling roots, they suffer

little or no transplant shock due to minimal root disturbance, and they can be safely transplanted over a longer period of time. Some can be planted with a dibble or planting bar; others are planted more effectively with a special tool that is the same shape as the container (roughly a bullet shape).

You can also plant seedlings in containers. It doesn't take tremendous technical knowledge or financial investment to grow at least some of your own seedlings. Basic requirements include

- some type of uniform containers
 - pint-size milk cartons (open at bottom)
 - styro blocks®
 - cone-tainers®
 - S-L book planters/rootainers®*
- a medium in which to grow seeds
 - Pro-Mix®
 - your own mix of soil, vermiculite, perlite, peat moss, etc.
- seeds
- a space to keep them—preferably under some kind of temperature and moisture control

One characteristic of almost all commercial containers is that they are open on the bottom, so that seedling roots will not become "pot-bound." Whatever holds the containers—a table, a simple wooden frame with a chicken wire bottom—should allow air to circulate *under* the seedlings. Such circulation will air-prune the roots and encourage greater proliferation of roots inside the containers (a similar process to that in the field-grown in-the-ground containers).

A fairly simple frame for containers can be made from scrap lumber or 2x4s.

(1) Make a frame with the 2x4s big enough to hold the number of containers you want.

(2) Cover the bottom of the frame with chicken wire, and staple lengths of wire periodically across the width and length to support the containers, if necessary.

(3) Support the frame itself on several cement blocks or stacks of bricks.

(4) You may need to mix your growth medium with some fertilizer (especially if you use peat moss, which is low in nutrients) before sowing the seeds.

(5) Be sure to keep them watered adequately, since each seedling is in a very small container. Many conifer seeds also have a chilling requirement (stratification) before they will germinate, but your seed source people can tell you whether or not the seeds are already stratified, and what to do if they are not and need to be. When the seedlings grow to be about 6 inches tall, you probably could plant them out successfully.

If you have reusable containers (and probably even milk cartons could be recycled once), clean them before re-use. Use a dilute bleach solution (1 part bleach to 10 parts water) to rinse out containers.

Check your seedlings frequently and look especially for signs of fungus or mold. Correct problems as you observe them. If you develop a talent for growing your own seedlings, you will have more control over all your plantation's operations, and you may also be able to supplement your income by selling extra seedlings to other growers.

Whether you grow your own, or purchase seedlings, always plan for 5 to 10% more seedlings than you actually plant, so that you can select the best ones and discard inferior plants. If you have particularly good seedlings throughout, extras can be heeled in or lined out for use if replacements are needed.

Seedling quality can decrease rapidly if plants are subjected to drying, heating or freezing during digging, storage, shipping or preplanting. Do everything you can to minimize plant stress.

**This list is not exhaustive. Inclusion of one name and not others does not imply endorsement of either a company or its products.*