



DOF Pine Seedlings are Top Choice

Genetically-Improved Seedlings Explained

Forestry Topic 1

September 2023

Cooperative Efforts

The Virginia Department of Forestry (DOF) nurseries are proud to be a member of several research cooperatives. The Tree Improvement Program at North Carolina State University works to increase value to landowners and citizens through continuous genetic improvement of forest trees. A goal is to enhance productivity through breeding, selecting and deploying superior loblolly pine families. The Auburn University Nursery Cooperative works to research and support nurseries in growing the best seedlings possible. DOF also works cooperatively with the Shortleaf Alliance and Longleaf Alliance on restoration of diminished species.

- ◆ Due to cooperative sharing of genetic material, the best families suitable for Virginia are grown at DOF nurseries.
- ◆ Selections have continuously placed emphasis on properties desirable for solid wood products (e.g., straightness and crown characteristics).
- ◆ Some families from other provenances and cold hardiness zones either perform erratically or fail in Virginia.

Advantages of DOF Genetically Improved Loblolly Pine

- ◆ Improved genetics for fast-growing, straight and disease-resistant seedlings
- ◆ Increased growth and yield over unimproved seedlings
- ◆ Increased profits from improved growth
- ◆ Excellent survival rates from top clipping of seedlings to control the shoot/root ratio
- ◆ Improved seedling protection with pioneered pales weevil treatment
- ◆ Completely dormant seedlings withstand shipment and planting significantly better than non-dormant seedlings

Benefits of Top Clipping Seedlings

Top clipping seedlings is a cultural practice that makes a significant difference in seedling performance. This practice controls the shoot/root ratio, which is the leading reason for good survival. Our research has shown repeatedly that seedlings with a shoot/root ratio of more than 2:1 will not survive as consistently well as seedlings with a shoot/root ratio of less than 2:1.

Importance of Dormancy

DOF seedlings go completely dormant...important for storage, shipping and planting. Fully-dormant seedlings can be stored for two to three months without survival loss, and can withstand shipment and planting much better than non-dormant seedlings.

Virginia is at the northern end of the loblolly growing range. In a cold hardiness and dormancy study by the Auburn University Nursery Cooperative, results showed that northern loblolly families are more cold hardy. DOF families are quicker to go dormant and slower to come out of dormancy. Southern families react faster to a warm spell and tend to come out of dormancy sooner. Due to warmer weather, seedlings grown farther south frequently never go completely dormant.

Pales Weevil Treatments

Pales weevil can have a devastating effect on seedling survival, ultimately causing high mortality in newly-planted pine stands. This insect feeds on the stems of pine seedlings, primarily in newly-cutover stands being replanted.

DOF pioneered the use of permethrin in treating seedlings for pales weevil control. Studies were done to develop an application method that works. To successfully treat pine for pales weevil, the stem must be treated; simply applying over the top with a three-point hitch sprayer does not work since it does not reach the stem. DOF's treatment method penetrates to the stem, treating the most vulnerable part of the seedling.

Virginia's Best Genetics

After more than 65 years of research, DOF's tree improvement program has extensive data on the field performance of the family selections in our orchards. We rank the families based on growth gains compared to unimproved wild seedlings planted in carefully-designed and monitored field trials. This **"P" (productivity) rating** is the percentage gain in volume growth through age six in those trials. With continued research and breeding within our orchards, we have produced seedlings with P ratings as high as 100 (i.e., 100% faster growth – twice as fast – as wild seedlings). By collecting and carefully blending seed from individual selections, DOF nurseries can offer landowners seedlings with a range of expected growth rates to suit individual landowner objectives. It is important to remember that outstanding genetics is just one part of a successful loblolly pine plantation. Silvicultural decisions, such as site preparation, planting density, competition control and mid-rotation thinning or other cultural treatments, also help to achieve the maximum genetic growth potential of DOF's seedlings. The DOF nursery offerings include:

DOF Pine Seedlings are Top Choice

Control Pollinated Loblolly Pine

\$160 per 1,000

Control pollinated seed comes from isolating female flowers on high-quality trees and fertilizing them with pollen from a different high-quality parent. This ensures identification of the true parents when seed collection occurs. Although more labor-intensive and costly than traditional wind-pollinated seed production, this process pays off with a **P rating of 90 or higher** (90% or greater growth gain over unimproved seedlings.)

Due to the higher cost of controlled pollination, DOF has a limited supply of these seedlings.

Virginia's Best Loblolly Pine

\$120 per 1,000

"Virginia's Best" is a select mix of a few of our very best producing open-pollinated parents within our seed orchard. The biggest difference compared to cross-pollinated seedlings is that these are provided from a known high-rated female parent that is fertilized by a random mix of pollen from the other trees in the orchard. These seedlings deliver a **P rating of 65 or higher**.

Our cross-pollinated and Virginia's Best seed lots are suitable for landowners focused on intensive management and maximum growth. While cross-pollinated supply is limited, we have a good supply of Virginia's Best seedlings.

Elite Loblolly Pine

\$100 per 1,000

Elite is an open-pollinated mix of seed from families ranked slightly behind the very best. Even in DOF's relatively young orchards, the quantities of these seedlings will be greater and still offer substantial growth advantages with a **P rating of 60 or higher**.

Elite seedlings, a larger mix of families, makes up the majority of our total crop. For landowners looking for a quality seedling at a cheaper price, this is a great option.

Premium Loblolly Pine

\$90 per 1,000

Premium seed lot comes from a mixture of a large group of parent trees proven to deliver a **P rating of 50 or higher**.

Premium seedlings represent a mixed third-generation seed lot. This offering still yields very good growth potential while providing uniformly straight trees at the time of harvest. These seedlings can only be purchased in the online store or by contacting the Augusta Nursery directly.

Longleaf Pine

\$25 per 50

DOF has been working diligently in preserving the native Virginia longleaf population. Seed is collected in the South Quay area of southeast Virginia from a small number of wild trees. DOF will provide seed in the future from agency orchards. Unlike other species sold as bare-root seedlings, longleaf seedlings are containerized.

Shortleaf Pine

\$120 per 1,000

Shortleaf pine is grown at DOF orchards. Plant this diminished species and help preserve this tree for generations to come.

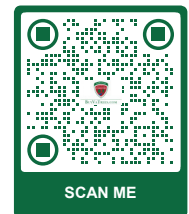


Top clipped seedlings perform more consistently.



Lifting seedlings while dormant improves survival rates.

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Scan this QR code to buy Virginia Trees online.

For more information about services or programs in your area, contact your local DOF office:

www.DOF.Virginia.gov



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