

## FIVE-YEAR PERFORMANCE OF LOBLOLLY PINE CONTAINERIZED SEEDLINGS GROWN IN FIVE GROWING MEDIA AND IN TWO TYPES OF CONTAINERS

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The first crops of containerized loblolly pine seedlings tested in 1972 were grown in a pure peat soil mixture using Ontario 3/4- by 4-inch split styrene tubes (1). The high cost of collecting, transporting, drying, screening, and fumigating peat soil dictated a change to other types of growing media.

In addition, labor to assemble tubes in trays and to fill them with growing medium was time consuming. Furthermore, roots in tubes are not air pruned and are encased in the tube when planted.

The 1973 experimental crops were designed to incorporate four additional growing media to the peat soil mixture and one additional type of container (2). The objective was to determine which growing medium and container would give the best results. This paper reports on the results of two test plantings after five growing seasons.

### Materials and Methods

The five different growing media tested were composed of the following materials (per cubic foot volume):

1. Peat soil, 5 ounces of dolomitic lime, and 1 ounce of 10-10-10 pulverized granular fertilizer with trace elements.

2. A 1:1 mixture of sphagnum peat and attic grade vermiculite, 3 ounces of lime, and 2 ounces of pulverized 10-10-10 fertilizer.
3. and 4. Two commercial 1/4-inch pine bark mixtures known as Kalmar Mix and Holts Nursery Mix. Both of these media were mixed with 3 ounces of lime, and 2 ounces of pulverized 10-10-10 fertilizer.
5. Pro-Mix B, a commercially prepared medium, composed of sphagnum peat and horticultural vermiculite and containing lime and fertilizer.

Two types of containers, styrene split tubes and Spencer-Lemaire Ferdinand Rootainers, were used with the five growing mediums. The commercially prepared growing mediums were not included in the August tests. No additional fertilizer was added to any of the growing mediums. Both containers are approximately the same size with a volume of 2.5 cubic inches. During planting, tubes are planted with the seedling, whereas root plugs are extracted from the Rootainers prior to planting.

Seed from the same North Carolina Coastal Plain seed source was used to grow seedlings for both test plantings. Seedlings were grown in a greenhouse for 4 weeks for the

After five growing seasons, containerized loblolly pine seedlings survived and grew about the same when grown in either a peat soil or sphagnum peat-vermiculite medium. Root plug-type seedlings survived and outgrew those planted in tubes.

first crop and 5 weeks for the second crop. Both crops were hardened for 4 weeks on outdoor benches.

The seedlings were hand-planted on August 15 and on September 28, 1973, at a spacing of 7 by 10 feet. A Coastal Plain site on Bladen Lakes State Forest, which had been clear-cut, chopped, and bedded the previous summer, was selected for both plantings.

### Results

Measurements were taken on 20 percent of the 2,600 seedlings comprising these tests. Mean survival, height, and diameter at breast height (d.b.h.) after five growing seasons are given in tables 1, 2, and 3. Best mean survivals were for the August-planted Rootainer seedlings grown in the peat soil (86 percent) and peat-vermiculite media (85 percent). Tubelings grown in these same media and also planted in August had survivals of 74 and 78 percent, respectively (table 1).

Survival of all the September-planted seedlings was unsatisfactory (42 to 63 percent). However, the Rootainer seedlings grown in the peat soil and peat-vermiculite media again had better survival than the tubelings. High mortality can probably be attributed to insufficient soil moisture. The soil was fairly dry when planted and

**Table 1.**—Mean survival of containerized loblolly pine seedlings grown in five different growing mediums and in two containers after five growing seasons

Type of growing medium used	Rootrainers containers		Ontario styrene tubes	
	August-planted	Sept.-planted	August-planted	Sept.-planted
	..... percent .....			
Peat soil	86	63	74	42
Peat-vermiculite	85	58	78	51
Pro-Mix B	—	59	—	56
Kalmar ¼-inch pine bark	—	45	—	—
Holts Nursery ¼-inch pine bark	—	58	—	48

this condition continued for 6 more weeks before a good rainfall occurred.

The best mean height growth was for the August-planted Rootrainer seedlings grown in the peat soil (13.1 feet) and in the peat-vermiculite media (12.7 feet). Also the September-

planted Rootrainer seedlings were taller than the tubelings grown in these same media. Seedlings grown in the pine bark media were considerably shorter than those grown in the peat soil and peat-vermiculite media (table 2).

Mean diameter growth at

**Table 2.**—Mean height of containerized loblolly pine seedlings grown in five different growing mediums and in two containers after five growing seasons

Type of growing medium used	Rootrainers containers		Ontario styrene tubes	
	August-planted	Sept.-planted	August-planted	Sept.-planted
	..... feet .....			
Peat soil	13.1	10.3	12.5	9.1
Peat-vermiculite	12.7	10.6	11.9	10.3
Pro-Mix B	—	10.8	—	11.0
Kalmar ¼-inch pine bark	—	8.8	—	—
Holts Nursery ¼-inch pine bark	—	9.2	—	10.1

breast height was best for the August-planted seedlings grown in the peat soil and in the two peat-vermiculite media. Diameter averaged about the same for the Rootrainer seedlings and the tubelings. For the September plantings, mean diameter growth was poorest for the Rootrainers grown in the two-bark media and greatest for the tubelings grown in the Holts Nursery pine bark media (table 3).

**Conclusions**

There was little difference in overall seedling performance of the seedlings grown in the peat soil and the two peat-vermiculite media. Seedlings grown in the pine bark media did not perform as well. Seedlings grown in the Rootrainers survived better and grew more in height and diameter than those grown in plastic tubes.

As a result of these tests, we prepare our own sphagnum peat-vermiculite growing medium. We use it in Rootrainer containers to grow commercial crops of containerized loblolly seedlings. We have gone from the 1:1 to 3:1 mix because we found, through subsequent tests, that better growth is obtained with this peat-vermiculite ratio (3). Also we now apply fertilizers through our irrigation system instead of mixing granular fertilizers in the growing medium.

**Table 3.**—*Mean d.b.h. of containerized loblolly pine seedlings grown in five different growing mediums and in two containers after five growing seasons*

Type of growing medium used	Roottrainers containers		Ontario styrene tubes	
	August-planted	Sept.-planted	August-planted	Sept.-planted
	..... inches .....			
Peat soil	2.2	1.8	2.2	1.6
Peat-vermiculite	2.3	1.7	2.3	1.8
Pro-Mix B	—	1.8	—	1.9
Kalmar ¼-inch pine bark	—	1.3	—	—
Holts Nursery ¼-inch pine bark	—	1.4	—	1.9

This soilless mixture is considerably cheaper than similar commercially prepared growing media, and it also has the advantages of requiring less labor to handle and being one-half

the weight of peat soil. It also gives the best soil retention on the roots when the seedlings are pulled from the Roottrainer containers during the planting operation.

**Literature Cited**

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