



# Early Performance of Loblolly Pine Seedlings Lifted with Two Nursery Lifting Machines

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## **The Bottom Line...**

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There was no impact of lifting machine (oscillating vs. reciprocating root cleaning systems) on either height growth or survival of loblolly pine seedlings through three years after planting.

## **Abstract**

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Study plots were installed on March 2, 2016 on the Big Woods State Forest to compare the early performance of loblolly pine seedlings lifted with two nursery lifting machines being used at the Department of Forestry's Garland Gray Forestry Center nursery. The objectives of this research were to determine whether the root beater mechanism (reciprocating vs. oscillating) on the lifters affected either survival or growth of seedlings. Results through the first three growing seasons indicate no statistically significant effects of lifter on either attribute. Survival averaged 91 and 87 percent and age three height was 6.0 and 5.8 feet for the reciprocating and oscillating systems, respectively.

## **Background**

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Prior to 2015, the Garland Gray Forestry Center utilized a lifter with an oscillating (also described as "rotary") root beater system to remove loblolly pine seedlings from the nursery beds. In 2015, a recently-purchased lifter that used a reciprocating beater system was added to increase capacity and provide a backup machine in case of breakdowns. Both lifters were used during the 2015 lifting season. After the 2015 planting season, some customers raised concerns that the new lifter was providing inferior results in terms of survival. Therefore, a controlled study was designed to investigate those issues.

## **Methods**

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Two treatments were compared: seedlings lifted either with a) the reciprocating lifter or b) the oscillating lifter. All seedlings were from the VDOF premium seed lot and were lifted from the same nursery field and section (Gray Field, section K) on February 2, 2016. They were graded to nursery specifications by contract crews on February 4, 2016 and immediately bundled and stored in the nursery coolers using standard procedures. Ten replications of paired plots – each consisting of 10-tree rows of seedlings lifted with each machine – were planted on the Big Woods State Forest

on March 2, 2016 by research personnel. Survival was recorded for each seedling on May 4 and August 16, 2016. Survival and total seedling heights were recorded on January 19, 2017, January 24, 2018 and January 15, 2019.

## Results

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The data are summarized in Table 1. The differences between the two lifters after three seasons in the field are statistically insignificant according to analysis of variance (Table 2). After three years, the survival averaged 89% and seedlings were just under 6 feet in height.

Based on these seedlings and the conditions of lifting, site, planting, and weather they experienced over three years in the field, there was no impact of lifting machine on field performance.

**Table 1. Annual survival (%) and height (ft.) of loblolly pine seedlings lifted with two nursery lifting machines over the first three years after planting.**

Lifter	Survival (%)			Height (ft)		
	2016	2017	2018	2016	2017	2018
Reciprocating	99%	94%	91%	1.1	2.6	6.0
Rotary	94%	91%	87%	1.1	2.5	5.8

**Table 2. Analysis of variance results for third-year results from the test of two nursery lifting machines.**

Dependent Variable	Probability of Greater F Statistic	
	Treatment	Replication
Survival	0.346	0.653
Height	0.392	0.029