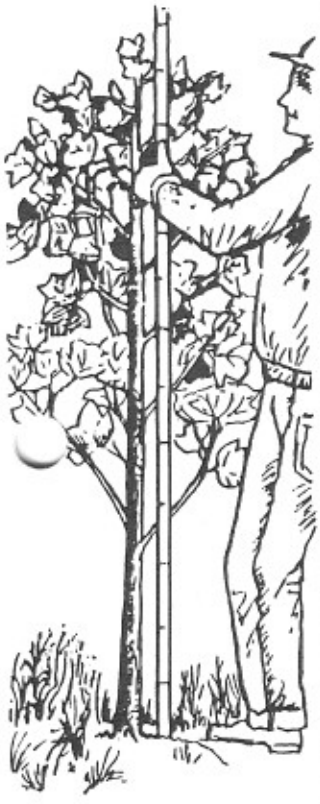

Occasional Report #119
March 1995

RIPPING TO IMPROVE LOBLOLLY SEEDLING SURVIVAL AND GROWTH

By Thomas A. Dierauf and John A. Scrivani

Virginia
Department of Forestry

RIPPING TO IMPROVE LOBLOLLY SEEDLING SURVIVAL AND GROWTH

By Thomas A. Dierauf and John A. Scrivani

Abstract

Loblolly pine seedlings were planted in rows that had either been ripped or not on 8 different tracts. Survival after 6 years was slightly better for unripped rows (84 versus 81). Height and DBH, on the other hand, were slightly greater for ripped rows at age 6, 15.26 versus 14.92 feet and 2.84 versus 2.71 inches.

Description of Study

A ripping study was installed on 8 different tracts on the Appomattox-Buckingham State Forest in the central Piedmont of Virginia. All plots were on well-drained, upland soils, which are representative of the soils in this region. Soils had well-developed clay subsoils and had undergone considerable top soil erosion as a result of clearing and farming operations during the 1800's and early 1900's.

Plots were installed in areas where skidder traffic had been heavy, so that ripping prior to planting might be beneficial. Several plots were located on deck areas, or partially on deck areas.

Each plot consisted of 10 rows of 20 seedlings, with 5 ripped rows alternating with 5 unripped rows. The ripping was done on January 20 and 23, 1989, using a single spike to rip to a depth of 16 inches. Actual depth achieved varied from about 12 to 16 inches. At this time of year, soils are well charged with water. Ideally, soils should be ripped when dry, but this would require ripping during the summer before planting. Rows were 10 feet apart.

Seedlings for planting were selected on February 10 at the seedling grading station at the Cumberland State Forest. Seedlings between $^{4.5}/_{32}$ and $^{6.5}/_{32}$ inch were selected and left in cold storage until they were planted.

Planting of the 8 plots was started on March 1, about 5 weeks after ripping, and ended on March 13, about 7 weeks after ripping. Ideally, more time should have elapsed to allow soil to settle. Planting was done directly in the ripped slit; it was easier to plant in the ripped slit but more difficult to pack the soil tightly. Also, there was some danger that an occasional seedling might be buried by soil later sloughing into the slit. Planting spacing was 6.6 feet between seedlings, so plots were about 130 feet long and 100 feet wide.

Results

The plots have been measured annually. Heights were measured to the nearest .1 foot for the first 3 years and to the nearest foot for the past 3 years. At age 6, the latest measurement, DBH to the nearest .1 inch was also measured.

Between age 1 and age 6, survival dropped 3 percentage points for both check and ripped seedlings. At both age 1 and age 6, survival of ripped seedlings averaged 3 percentage points lower than check seedlings (Table 1), but the difference is not statistically significant (probability of a larger F = 0.262). At age 6, check seedling survival was better on 5 of the 8 plots.

Table 1. Average survival at age 1 and 6 on each plot.

	Age 1		Age 6	
Plot	**Rip**	**Check**	**Rip**	**Check**
Talbert, East	72	76	66	74
Talbert, West	36	47	34	45
Burnham	84	93	76	87
Glover	94	96	93	95
Webb	96	92	95	91
Wise	96	97	95	93
Featherstone, West	96	97	95	96
Featherstone, East	95	95	93	92
Means	**84**	**87**	**81**	**84**

Average height at each measurement for each of the 8 plots is presented in Table 2. At age 6, ripped seedlings were taller on 6 of 8 plots, and the overall average difference was 0.34 feet, which is not statistically significant (probability of a larger F = 0.100). The overall average difference in height was 0.06, 0.18, 0.36, 0.44, 0.38, and 0.34 feet after 1, 2, 3, 4, 5, and 6 years respectively (Table 2). The difference is not becoming greater, in fact it has decreased slightly over the past 2 years.

Table 2. Average height (in feet) on each plot from age 1 through age 6.

	Mean Height											
	Age 1		Age 2		Age 3		Age 4		Age 5		Age 6	
Plot	**Rip**	**Ck**	**Rip**	**CK**	**Rip**	**Ck**	**Rip**	**Ck**	**Rip**	**Ck**	**Rip**	**Ck**
Talbert, East	1.06	0.98	2.47	2.09	5.31	4.66	8.39	7.78	11.92	11.20	15.46	15.10
Talbert, West	1.02	1.07	2.06	2.16	4.78	4.96	7.57	7.83	10.60	10.96	14.32	14.79
Burnham	0.76	0.75	1.78	1.66	3.61	3.43	4.94	4.72	7.65	7.65	11.35	11.39
Glover	1.24	1.22	2.67	2.52	5.89	5.71	9.31	9.19	12.63	12.58	16.39	16.35
Webb	1.07	0.94	2.37	2.10	5.21	4.78	8.70	8.02	11.58	11.01	15.64	14.87
Wise	1.08	1.06	2.59	2.46	5.83	5.49	9.60	9.16	12.90	12.43	17.23	16.96
Featherstone, West	1.21	1.14	2.80	2.54	5.71	5.18	9.13	8.41	12.44	11.87	16.36	15.70
Featherstone, East	1.03	0.88	2.18	1.92	4.89	4.14	8.33	7.37	11.20	10.15	15.34	14.21
Means	1.06	1.00	2.36	2.18	5.15	4.79	8.25	7.81	11.36	10.98	15.26	14.92
Difference	0.06		0.18		0.36		0.44		0.38		0.34	

Average DBH at age 6 is presented in Table 3. Ripped seedlings were larger on 7 of the 8 plots. The overall average difference was .13 inches, which was statistically significant (probability of a larger F = 0.026).

Table 3. Average DBH (in inches) for ripped and check seedlings on each plot.

	DBH	
Plot	**Ripped**	**Check**
Talbert, East	2.97	2.82
Talbert, West	2.62	2.67
Burnham	1.95	1.92
Glover	3.08	3.06
Webb	2.87	2.60
Wise	3.28	3.18
Featherstone, West	3.03	2.87
Featherstone, East	2.88	2.57
Means	**2.84**	**2.71**

Conclusions

It would be hard to justify the expense of ripping based on the results of this study. The small gains in height and DBH at age 6 are not likely to get larger. Planting was easier after ripping, but it is unlikely that the cost of planting would have been reduced enough to pay for much of the cost of ripping. We were surprised at these results; we had expected greater gains from ripping.