



North Carolina Forest Service

To protect, manage, and promote forest resources for the citizens of North Carolina

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Forestry Herbicides: Site Prep versus Release?

The use of herbicide is an increasingly popular tool for intensive management of loblolly pine largely because it is cheap and effect way to increase productivity. Current harvesting methods are leaving “cleaner” sites with little or no visible competition remaining. Forestland managers are tempted to take advantage of this situation and advise landowners to plant and release rather than do a site preparation. The idea is that the combined effect of an additional growing season, lower treatment cost, and the growth response from the release treatment would provide a better return. Lots of research shows that controlling hardwood competition at site prep or by release increases pine growth and therefore volume. But which is the most profitable? And ultimately, which is the is the wiser investment?

Some insight to these questions is found in a recent publication by the Virginia Department of Forestry, titled “Site Prep vs Release for Woody Competition Control in Loblolly Pine: 10-Year Growth and Projected Financial Returns”. The study reports on the effects of herbicide competition control for site preparation versus release on loblolly pine growth, and using growth and yield modeling, projected financial returns from that data. The paper is authored by Jerre Creighton, Research Program Manager, Virginia Department of Forestry.

He concluded, “Effectively controlling competing hardwood vegetation is essential to maximizing pine productivity. Doing so with a pre-plant site preparation treatment increases hardwood control and the resulting pine production compared to waiting until age two to apply a release treatment.” Increased productivity means a bigger return on investment.

Some of the results reported in the paper:

- At age 10 trees in the Oct 1 site prep treatment average 6.6 inches DBH and 38 feet height compared to the untreated at 4.8 inches DBH and 29 feet height, and the release at 6.1 inches DBH and 34 feet height.
- Compared to the untreated plots - the herbicide release at age 2 increased volume by 55%: the site preparation increased volume by 101% (Oct 1) and 90% (Sept 3).
- The October site preparation produced 30% more volume than the release at age 2.
- The site prep treatment has 57 more trees in the 7 inch and 8 inch diameter class compared to the release (262 trees compared to 167 trees).

- To measure intensity of competition the study utilized a pine free-to-grow (FTG) rating with 0 - indicating no hardwood competition; 1 - hardwoods are shading lower half; 2- hardwoods are shading upper half; 3- pine overtopped but will live; and 4 - pine is so overtopped it will die.
- At age 10 the untreated trees had a FTG rating of 2.18 compared to 0.72 for the release at age 2, and 0.35 for the site preparation of Sept 3.
- The report also shows the FTG rating for all treatments declined from age 5 to age 10 indicating that the pines are outgrowing the hardwoods in height (i.e. fewer hardwoods are growing fast enough to continue shading the pines).

This paper documents the clear advantage in growth provided by site preparation. Foresters must also remember another significant advantage of a site prep treatment over release - wildling pine control. There are no herbicide treatments to control intruding wilding pines after planting, only a costly mechanical pre-commercial thinning.

The abstract for the report follows:

Abstract: A study of the effects on loblolly pine growth of seven herbicide competition control alternatives was installed at the Appomattox-Buckingham State Forest between July 2005 and August 2007. After 10 years, the analysis of variance indicates that hardwood completion control has had a significant ($P < 0.01$) positive effect on pine growth (basal area and volume). The plots receiving site prep treatments applied September 3 and October 1 contain an average of 99 ft.²/acre of basal area and 1748 ft.³/acre of total volume compared to 85 ft.² and 1384 ft.³/acre on plots released from competition after the second growing season and 56 ft.²/acre and 895 ft.³/acre on untreated plots. Projecting the current diameter distributions to a 40-year rotation indicates that maximum productivity (mean annual increment) would reach 4.0, 5.8, and 6.8 green tons per acre per year on the untreated, released, and site-prepared plots, respectively. Applying commonly accepted financial formulae to calculate present value (PV) indicates maximum per-acre financial return (without thinning) from untreated, released, and site-prepared scenarios would be \$388 (at age 24), \$576 (at age 23) and \$686 (at age 22), respectively, under current market pricing.

The entire report can be accessed through the link below:

http://dof.virginia.gov/infopubs/_research-reports/RR-130.pdf