



## Growth and survival of *Pinus taeda* in response to surface and subsurface tillage in the southeastern United States

Colleen A. Carlson, Thomas R. Fox, Steve R. Colbert, Daniel L. Kelting,  
H. Lee Allen, Timothy J. Albaugh

Forest Nutrition Cooperative

*Department of Forestry, Virginia Polytechnic Institute and State University 228 Cheatham Hall Blacksburg VA 2061-4 United States*  
*Department of Forestry and Environmental Resources, North Carolina State University Raleigh, NC 27695-8008, United States*

Received 14 March 2006; received in revised form 5 July 2006; accepted 6 July 2006

### Abstract

A trial series investigating the impact of surface and subsurface tillage on the survival and growth of planted *Pinus taeda* L. was established between 1994 and 1998 with the goal of identifying site types responsive to tillage. The trial series consisted of 15 studies with multiple replicates of a 2 x 2 factorial with surface (offset disking or opposed bedding) and subsurface (winged subsoiling shank) tillage. Subsurface tillage significantly improved survival at four sites and surface tillage improved survival at one site. The positive response to the subsurface tillage was associated with the Piedmont sites where survival improved from 74 to 82%. Surface tillage significantly improved height, diameter and volume growth with the response being greatest on soils with siliceous mineralogy, which showed an improvement of 5.1 m<sup>2</sup> ha at 6 years. The improvement was less for soils with kaolinitic mineralogy (4.0 in<sup>2</sup> ha<sup>-1</sup>) or those with mixed mineralogy (3.1 in<sup>2</sup> ha<sup>-1</sup>). Initially Piedmont sites showed a positive response due to subsurface tillage. However, the response was short lived and had dissipated by year 6. Effects of tillage on stand uniformity were negligible. In general, responses to tillage were relatively small compared to those that can be obtained from other silvicultural practices such as vegetation control and fertilization.

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**Keywords:** Disking; Ripping; Subsoiling; Loblolly pine

### 1. Introduction

Site preparation is critical to the successful regeneration of pines in the southeastern United States because it creates conditions favorable for planting, as well as improving seedling survival and enhancing growth (Lowery and Gjerstad, 1991). Whether accomplished by burning, herbicide application or tillage, site preparation can reduce competition, improve resource availability, and aid planting and site access through the disposal of debris.

Mechanical site preparation, such as disking, bedding or subsoiling can alter the volume of soil and the configuration of soil available to each seedling (Morris and Lowery, 1985). The benefits of surface tillage treatments such as disking and bedding are generally associated with improved tilth and/or aeration of the surface soil, which can result in decreased

Corresponding author. Tel.: +1 540 231 0958, E-mail address:  
[carlsonc@vt.edu](mailto:carlsonc@vt.edu) (C.A. Carlson).

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