

Plantation Management Research Cooperative

Daniel B. Warnell School of Forestry and Natural Resources

The University of Georgia

Athens, Georgia 31204-2152

SLASH PINE SITE PREPARATION / SECOND ROTATION STUDY

In 1980, the PMRC established a large regional experiment to compare growth and development of slash pine plantations established with different site preparation methods. Treatments included a check (harvest and plant with no site preparation); chop only; chop and burn; chop, burn and bed; chop, burn, complete weed control (all vegetation except slash pine trees removed for the life of the stand); and chop, burn, bed, and complete weed control. This was the first large-scale trial in the South to evaluate complete weed control. Each of the treatments, with the exception of the check, was established with and without fertilization. In addition, one plot was included in an attempt to duplicate the site preparation, planting density, and seedling source, of the previous stand, the objective being to compare yields from one rotation to the next. Each treatment plot was 0.5 acre in size. The study was evenly stratified over 4 soil groups with 5 installations in each group. It was measured at age 2, and every three years thereafter.

Status

- **The study is ongoing. Twenty-six year measurements were made in 2005. The 23 year report is contained in PMRC TR 2003-3.**
- **Fifteen installations of this study remain viable. One site was lost to harvesting operations during 2001. Of these, six are nonspodosols and nine are spodosols.**

Key Research Results (Age 23)

- **Bedding significantly increased average and dominant height but was not a significant factor for dbh or crown length. Bedding resulted in a significant decrease in crown ratio for nonspodosols. Herbicide and fertilization significantly increased average and dominant tree height, dbh and crown length.**
- **Herbicide significantly decreased crown ratio on spodosol soils, but was not significant on nonspodosols. Unlike younger ages, some of the least intensively managed plots had crown lengths at age 23 comparable to the most intensively managed plots.**
- **In general, treatments that promoted rapid height growth tended to result in higher levels of cronartium infection. Herbicide had the only significant effect on cronartium, increasing the infection rate.**
- **Spodosols, which make up approximately half of flatwoods sites can be made as productive as non-spodosols with intensive treatment.**
- **Most intensive treatments resulted in volume production of about 2.5 cords/ac/yr as opposed to about 1.6 cords/ac/yr for mechanical site preparation and less than 1.1 cord/ac/yr for no treatment. Through age 17, the vegetation control treatments were clearly the best treatments, especially for the spodosols. By age**

20, the fertilization treatment effects were increasing compared to the vegetation control treatments indicating that if the gains obtained early in the rotation from vegetation control are to be maintained, the stand must be fertilized. The combination of vegetation control and fertilization is the best treatment. On treatments with vegetation control, but without fertilization, volumes at age 23 are less than treatments with both bedding and fertilization.

- Growth was evaluated for all 3 year periods beginning at age 5. Fertilization not only increased total yield, but it slowed the rate at which growth decreased over time, indicating how valuable added nutrition is in maintaining rapid growth in intensively managed slash pine plantations.**
- A unique design for this study allows for the comparison of previous rotation yields to current rotation yields. An attempt was made to duplicate the site preparation, genetic material, and planting spacing. Chuck Rose, the PMRC assistantship student of the last several years, investigated the role of drought in the comparison. His results were published in a Southern Journal of Applied Forestry paper cited as follows:**

Rose, C. E., Jr. and B. D. Shiver. 2002. An assessment of first and second rotations average dominant/codominant height growth for slash pine plantations in South Georgia and North Florida. South. J. Appl. For. 26(2): 61-71.