

NITROGEN BENEFITS SLASH PINE FOR 5 YEARS¹

L. C. WALKER, *Dean, School of Forestry, Stephen F. Austin State College, Nacogdoches, Tex.*

A plantation of 9-year-old slash pine (*Pinus elliottii*) in the sandy lower Coastal Plain of Georgia was

fertilized with 200 lb./a. of nitrogen, 44 lb./a. of phosphorus, and with both amounts of these elements. For each of the first 3 years following treatment, diameter and basal area growth response to nitrogen was obtained.

Average maximum stimulation for all trees occurred

¹ This paper reports on a study conducted cooperatively with the Langdale Company of Valdosta, Ga., the National Plant Food Institute, Monsanto Chemical Co., the University of Georgia, and the Georgia Forest Research Council. T. E. Connell helped collect the data.

the year after fertilization. The diameter growth of the largest 400 trees per acre was also significantly increased by nitrogen treatment. Phosphorus supplements did not respond in the deep sandy soil. There was no apparent height growth response.

Concentration of nitrogen in needles was increased 1 year after treatment; however, by the end of the third growing season no differences in foliage were apparent for nitrogen, phosphorus, potassium, and calcium content. Chemical analyses for litter and fermentation layers showed that the latter had a high nitrogen content. After 3 years neither needle lengths nor soil analyses differed between treatments (1).

After 2 more years the 5-year growth was averaged for all treatments and tested by analysis of variance. Treatment apparently had not significantly affected diameter growth. This was not unexpected because many trees in the unthinned fertilized plots were suppressed and were growing no faster than the best of the check-plot stems. However, when only the largest

400 trees per acre were considered, treatment was significant at the 1-percent level of confidence: Nitrogen continued to influence diameter growth, and phosphorus was still ineffective in stimulating growth (table 1). Phosphorus, when applied with nitrogen, may have stimulated growth several years after treatment more than during the first year or two following application.

After 14 years, the largest 400 trees per acre averaged 6.0 inches d.b.h. In contrast, the average tree in this plantation, initially planted at 6 by 6-foot spacing in a well-drained Lakeland fine sand, was about 5.2 inches. The crowns of trees in unfertilized plots

were much thinner than those in the nitrogen-treated areas. The crown ratio was about 25 percent on the unfertilized plots and 30 percent on those given nitrogen. For all plots, prompt thinning was required to maintain adequate crowns. Also, less foliage had accumulated on the nitrogen plots than on the other plots.

Details of plot installation and data collection are given in the paper cited.

Literature Cited

TABLE 1.—Average annual growth (d.b.h.) of the largest 400 trees per acre for the 5-year period since fertilization

Treatment			Growth <i>In.</i> ¹
Lb./a.	Element	Form	
200	N.....	NH ₄ NO ₃	0.228
200	N.....	NH ₄ NO ₃238
44	P.....	20% super.....	.183
44	P.....	20% super.....	.183
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¹ Field measurements were made to the nearest one-tenth inch.

(1) Walker, L. C., and Youngberg, C. T.

1962. Response of slash pine to nitrogen and phosphorus fertilization. Soil Sci. Soc. Amen. Proc. 26: 399-401. Also reported in Youngberg, C. T., et al. 1963. Ga. For. Res. Couna Pap. 17.