

## Planted Pitch Pine Responds to Fertilization

James W. Curlin  
Division of Forestry Development, Tennessee Valley Authority  
Norris, Tenn.

The Copper Basin is a 23,000-acre man-caused desert in the southeastern corner of Tennessee. Copper smelting, destructive logging, uncontrolled fires, and grazing have eliminated forest growth. Erosion has been severe and natural revegetation is slow.

Allen reported<sup>1</sup> results of early planting tests in the Basin with native species of pine, which showed that pitch pine (*Pinus rigida*) survived better than other southern pines tested on an extremely poor planting site. The success of pitch pine was attributed to rapid and extensive root development the first year after planting.

To supplement earlier species trials, a test was established to determine the effects of fertilization on the growth and survival of principal southern pine species native to the area. The test site was eroded Hayesville fine sandy loam soil, with clay loam of the B1 horizon exposed. Natural fertility of this soil series is moderate, but loss of the A horizon in the Copper Basin has made these soils infertile. Four species of pine--shortleaf (*P. echinata*), loblolly (*P. taeda*), Virginia (*P. virginiana*), and pitch (*P. rigida*)--were planted on milacre plots in adjoining 4 by 4 latin square designs. Fertilizer treatments were as follows:

Check--No treatment.

P--70 pounds of elemental phosphorus per acre.

NP--80 pounds of nitrogen + 70 pounds of phosphorus per acre.

NPK--80 pounds of nitrogen + 70 pounds of phosphorus + 33 pounds of elemental potassium per acre.

Fertilizer materials were ammonium sulfate (21 percent N), calcium metaphosphate (27 percent P), and potassium chloride (51 percent K). Appropriate per-acre rates were applied broadcast within a 6-inch diameter circle around each tree.

Average first-year survival was as follows:

Shortleaf .....	30 percent.
Loblolly .....	52 percent.
Virginia .....	22 percent.
Pitch.....	95 percent.

Poor survival of shortleaf, loblolly, and Virginia pine precluded analysis of the effect of fertilizer on the growth of these species.

Statistical analysis of the pitch pine data revealed that, whereas survival was not affected by any single fertilizer treatment, growth was. Height growth measurements were taken over a span of 7 years. Analysis of variance showed that NP and NPK treatments significantly stimulated height growth during the 7-year measurement period (fig. 1). Early growth was increased by nitrogen and phosphorus. Later, the complete fertilizer resulted in a 34-percent increase in height growth over the untreated check. While nitrogen affected early growth, phosphorus and potassium appear to be largely responsible for the long-term increase in height growth.

<sup>1</sup> Allen, J. C. Pine Planting in the Copper Basin. Jour. Tenn. Acad. Sci. 25(3). 1950.

Though not conclusive, this test indicates that the growth of pitch pine can be stimulated by additions of mineral fertilizer on soils similar to those of the study area and that further research with higher rates and different combinations may aid rapid establishment of plantations of this species.

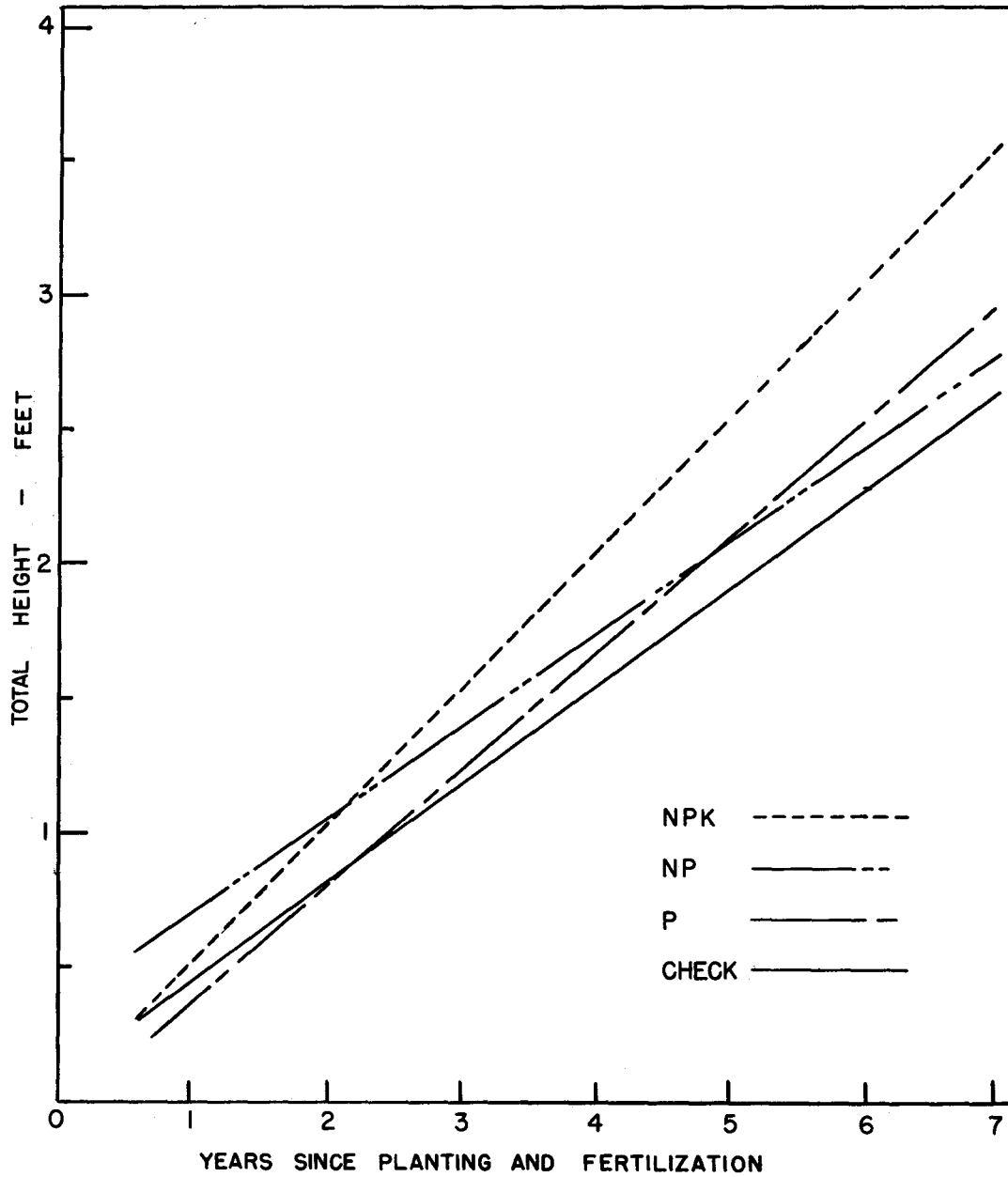


Figure 1.--Growth of pitch pine after planting and fertilizer treatment.