PLANTED SHORTLEAF RESPONDS TO PROMPT RELEASE

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Controlling competing hardwoods on the Cumberland Plateau increased the growth of planted shortleaf pine. Immediate release by girdling and cutting plus applying silvicide gave best growth of shortleaf pine planted under low-grade hardwoods near Sewanee, Tenn. Delaying the release for 1 and 2 years after planting did not significantly affect survival or growth after release, although development before release was retarded by competition with hardwoods. Release without silvicide resulted in poorer growth for the 5-year period.

Shortleaf pine was hand-planted in February 1957 ona gently rolling area about 1,900 feet in elevation. The soil is_Hartsells fine sandy loam, which is low in organic matter, infertile, and well to excessively drained. The site was dominated by a low-grade stand of oak and hickory that had 68 square feet of basal area per acre in stems 3 inches d.b.h. and larger and a merchantable volume of about 2,000 board feet per acre in tie and local-use logs. The moderately dense under story was composed of oak, hickory, blackgum, sassafras, dogwood, hairy locust, and other species.

Four release treatments, plus unreleased checks, were replicated four times in randomized blocks of 0.25 acre. In April 1957 hardwoods over 4 inches d.b.h. were girdled, and smaller stems down to about 0.5-inch stump diameter were cut. In the same month, hardwoods were cut the same way on another four blocks, but silvicide was applied to girdles and stumps. In the third and fourth treatments, girdling and cutting supplemented with silvicide was repeated in April 1958 and April 1959.

The silvicide was 1 gallon of 2,4,5-T (4 pounds acid equivalent) per 25 gallons of diesel oil. It was applied to the point of runoff. About 2 gallons of solution per acre was required to treat girdles, and an additional 9 gallons was needed to treat stumps.

Five years after they were planted, pines that had been released immediately with silvicide averaged 6.2 feet in height. Where release with silvicide was deferred for 1 or 2 years, they averaged 4.9 and 3.7 feet, respectively (fig. 1). Immediate release without 2,4,5-T yielded saplings that averaged only 4.7 feet tall and that grew less than 1 foot during their fifth year. Fifth-year growth was more than 1.5 feet where girdling and cutting had been supplemented with silvicide, regardless of year of release. Unreleased pines averaged only 1.5 feet in height after 5 years in the field.

The summer of 1957 was drier than usual, but initial survival was good in all treatments. During the first 4 years, mortality averaged less than 30 percent, even on unreleased plots. Mice, sawflies, and falling hardwoods caused most of the loss. By the end of the fifth year, hardwood competition had reduced survival on unreleased plots to less than 55 percent; survival on released plots was 67 to 78 percent.

While the kill of overstory hardwoods was nearly complete, untreated stems (those less than 0.5 inch in diameter at the time of release) responded vigorously to release on all plots. Sassafras and hairy locust were particularly troublesome.

After 3 to 5 years, depending on year of release, hardwood brush again covered 28 to 35 percent of the plots where silvicide had been used, but enough pines were free to grow to make satisfactory stands (fig. 2).

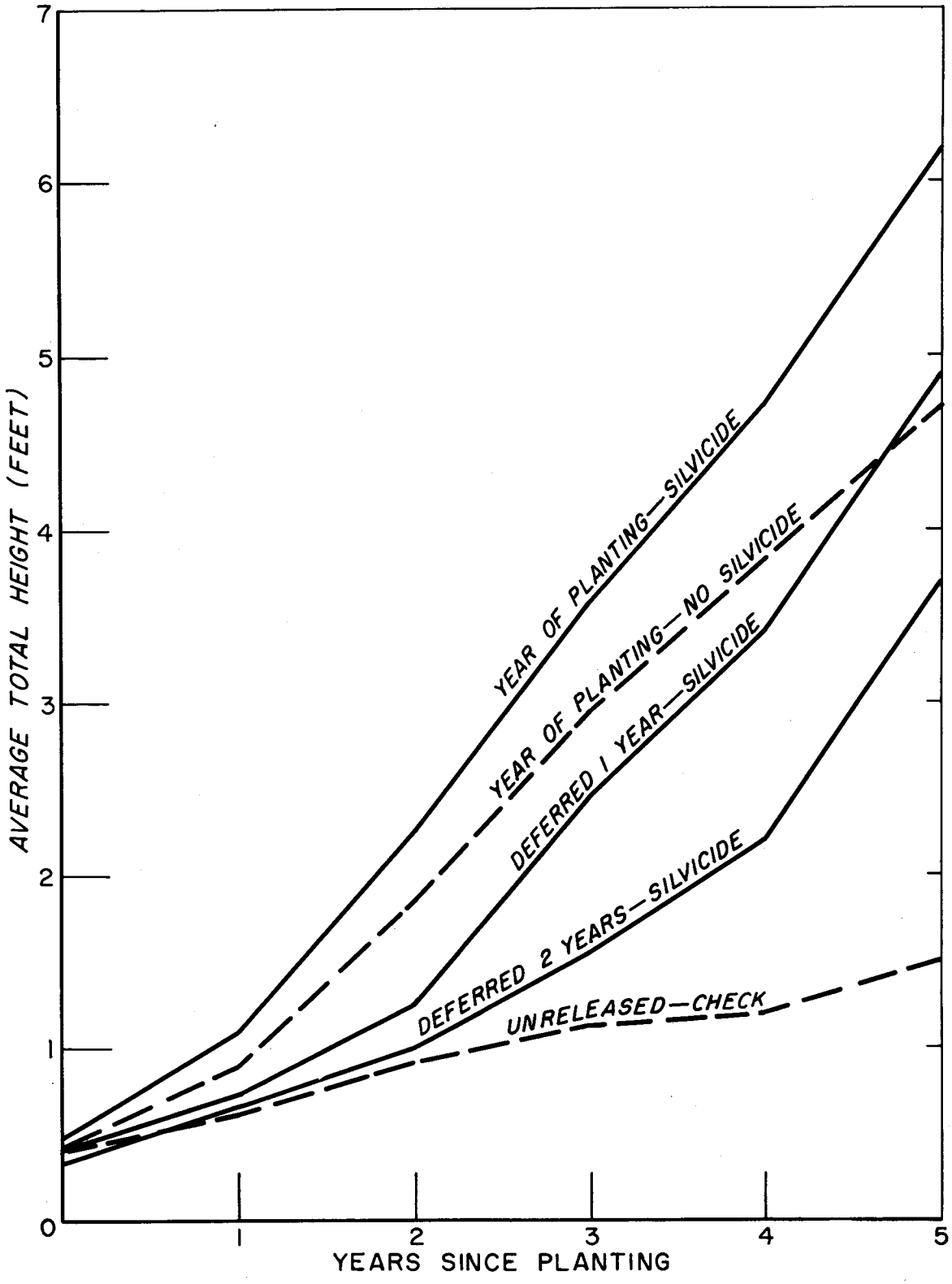

Figure 1.--Growth of underplanted shortleaf pine released at different ages.

Figure 2.--Pines on this plot were released with silvicide during the year of planting. Enough are free to grow to make a satisfactory stand, as on all plots where 2,4,5-T was applied--even if deferred 1 or 2 years after planting.

On plots where pines were released without silvicide (fig. 3), more than 50 percent of the area has been pre-empted by fast-growing sprouts, and shortleaf growth is declining. This is a strong argument for including a silvicide in the conversion prescription for comparable sites.

Failure to release pines promptly sacrificed about 1 year's growth for each year seedlings were suppressed. Under favorable or average conditions, probably not many seedlings will die if release is deferred for 2 years, but immediate release insures against severe drought.

Figure 3.--These pines were released without silvicide during the year of planting. Only about one-half of the pines released without silvicide are free to grow.