FROM OAK-HICKORY TIE ORCHARDS TO PROFITABLE WHITE PINE--BY DIRECT SEEDING

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Low-yielding, economically marginal plateau hardwood stands--tie orchards--can be converted to profitable eastern white pine by direct seeding. In a study near Sewanee, Tenn., both repellent-coated and untreated seed produced acceptable stands when broadcast sown

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on disked sites. But by reducing seed losses to birds and rodents, the repellents almost doubled the number of surviving seedlings and significantly improved their distribution.

Although not native to the Cumberland Plateau north of Alabama, loblolly pine is often favored for type conversion because it grows rapidly and is readily merchantable for pulpwood. Much white pine is also planted; that from appropriate seed sources appears to grow at least as fast as loblolly. Because white pine is more resistant than loblolly to injury from snow and cold, it may have distinct advantages for northern areas of the Plateau.

The site seeded was typical, almost level, and 1,860 feet above sea level. The soil, a Hartsells fine sandy loam, extended, on the average, about 3 feet to sandstone bedrock. A light stand of low-grade sawtimber and poles, mainly oaks and hickories, dominated the area. A fairly dense understory included sourwood, blackgum, dogwood, locust, other species, and oak and hickory reproduction.

In mid-March 1959, the area was lightly disked with light farm equipment. About 1 hour of work per acre was required (fig. 1). Disking broke up the continuous layer of hardwood litter, exposed mineral soil, and prepared a suitable seedbed without severely disturbing the site.

In early April, repellent-coated and untreated eastern white pine seed was broadcast sown at the rate of 10,500 full seeds (about 0.6 pound) per acre. Each treatment was tested on four 0.1-acre randomly chosen plots. For repellent treatment, 0.054 pound of Arasan 75 plus 0.01 pound of endrin 50W was applied per pound of seed. The blended dry chemicals were applied over a latex sticker, and seed then was coated lightly with aluminum powder for lubrication. All seed was from western North Carolina and was cold-moist stratified for 17 days before treating and sowing.

In early May, sawtimber and small poles were killed with 2,4,5-T applied with a tree injector. Light disking to prepare seedbeds seldom adequately controls small hardwoods. Therefore, a basal spray of 2,4,5-T was applied to remaining stems larger than about 0.5 inch in diameter.

Figure 1.--This light tractor and bush-and-bog-type disk prepared seedbeds suitable for sowing white pine, at the rate of about 1 acre per hour.

Gross normal field germination (under screen wire cones) was 53 percent for repellent-treated cones and 64 percent for untreated seed. But any inhibiting effect of the chemicals was more than offset by reduced seed losses. Total first-year germination for treated seed was 3,050 seedlings per acre and only 1,675 seedlings per acre for untreated seed.

Survival over the first growing season averaged 78 percent. By November plots with treated and untreated seed had 2,350 and 1,350 seedlings per acre, respectively. Eighty percent of the treated milacres that were sampled and 68 percent of the untreated milacres that were sampled were stocked with one or more seedlings. Few trees died in later

years despite severe early summer droughts in 1960 and 1962.

Delayed germination partially compensated for losses; 225 seedlings per acre from repellent-treated seed and 150 seedlings from untreated seed germinated late.

The site was also surveyed four seasons after sowing. Plots broadcast with treated and untreated seed had 2,050 and 1,250 seedlings per acre, respectively. Seventy-eight percent of the treated milacres sampled and 62 percent of the untreated milacres sampled were stocked.

Growth of direct-seeded white pine compares favorably with that of planted seedlings of the same age. After 4 years seedlings averaged 1.3 feet in height (based on the tallest per milacre). On better plots they were almost 2.0 feet tall (fig. 2). The average height for 2-0 white pines, planted from a North Carolina source on a nearby similar site, was 1.2 feet after 2 years in the field.

Prescriptions widely used for direct seeding southern pines can be adapted to eastern white pine. The major requirements for success are suitable seedbeds and the timely sowing of enough good seed treated with proven repellents. On most soils, control of competing hardwoods will also be needed, even though young white pine is more tolerant than the southern yellow pines.

As in this test, satisfactory stocking may sometimes be obtained with unprotected seed. But the better stands obtained with treated seed show repellents are valuable. There is no economical way of predicting the severity of animal depredations before sowing. Repellents are a minor part of the investment needed to convert unproductive hardwood stands to pine by direct seeding. To omit repellents in the hope that rodents and birds will be scarce would be foolhardy.

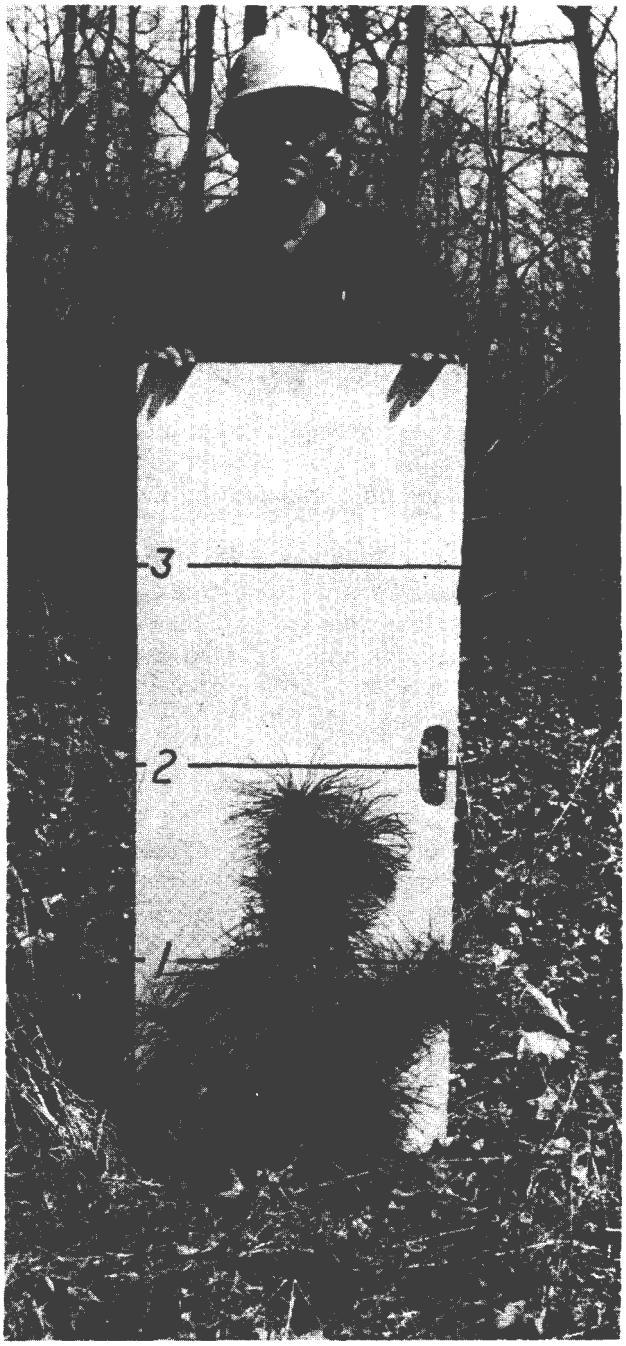

Figure 2.--Direct-seeded white pine after four growing seasons.