IMPROVING LOBLOLLY PINE SURVIVAL IN ROADBANK STABILIZATION

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Loblolly pine is used increasingly for road-bank stabilization. The northwest district of the Mississippi Highway Department has planted 5 million trees on roadbanks since 1960, more than 2 million of which have been planted along an Interstate Highway. Survival and growth of roadbank plantings have been erratic. This article reports how both were influenced when loblolly seedlings were planted with a power posthole auger and with planting bars on loessial or sandy roadbanks, and on north and south slopes.

The Experiment

In the late summer of 1962, roadbanks of a new by-pass running east and west were fertilized and limed with 1,000 pounds of 13-13-13, 200 pounds of ammonium nitrate, and 2 tons of agricultural limestone per acre. Next, they were seeded with 30 pounds of Bermuda grass, 8 of crimson clover, 5 of rye grass, 10 of Ladino clover, and 4 pounds of Pensacola Bahia grass per acre, then mulched with 2 tons of straw per acre.

Forty-eight roadcuts with 2:1 slopes were chosen from this treated stretch of prepared roadbanks. Twenty-four staked plots were located on loessial soil and 24 on sandy soil. Twelve plots on each soil type were on a north aspect and 12 on a south aspect.

In late February, 1963, 50 loblolly pine seedlings were planted on each plot, half with standard planting bars (see fig. 1), the other half in holes dug at least 18 inches deep with the power posthole auger.

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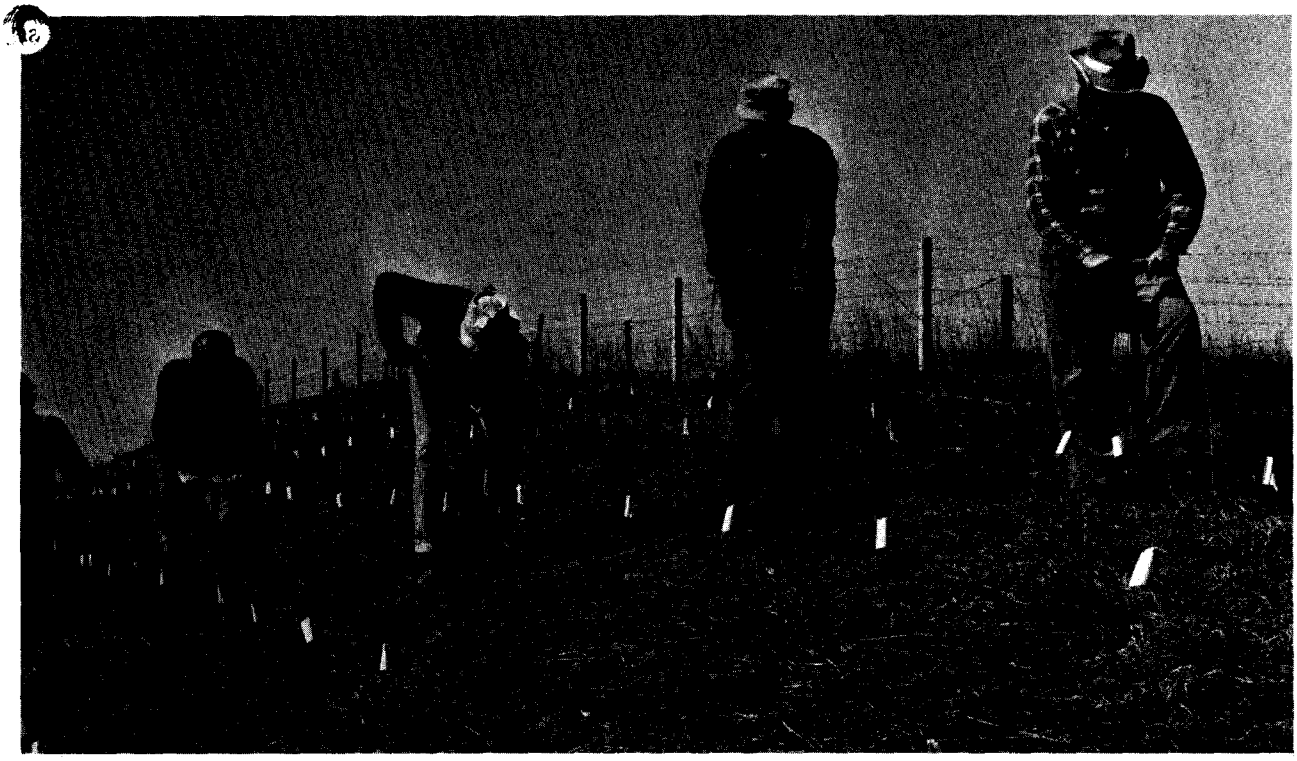

Figure 1.—Planting loblolly seedlings on the south aspect of a roadcut.

Results

The third-year inventory showed seedling survical significantly better on the north aspects and where planted in postholes. Posthole survivals were 81 percent, compared to 62 percent when planting bars were used. North aspect survivals were 84 percent; south aspects only 58 percent. Previous planting studies in old fields had suggested that survival would be better on loess and growth better on sand, but in this study, survival was not affected by soil type.

Neither soil nor treatment had any great effect on seedling heights. At the end of three growing seasons seedling heights by treatments averaged from 3.5 to 3.9 feet.

Mortality during 1963, 1964 and 1965 was 32, 10, and 0 percent respectively on the south aspect; 12, 2, and 0 percent respectively on the north aspect. May 1963 was abnormally dry and all but 3 percent of the first-year mortality occurred before June 10.

The heavier mortality and slower growth on the south aspect is attributed to greater exposure to sun, higher temperatures, drier soil, and more rapid deterioration of the protective mulch in 1963.

Planting activity disturbed the soil, which had been covered with mulch and dead rye grass. Much of the first year's mortality can be attributed to washing, particularly of trees planted in postholes in sand and especially on the south aspect. Erosion was worse on steep slopes and on the lower reaches of long slopes.

Washing ceased by the end of the third growing season, except for spots. Soil by then was beginning to mound up behind the seedlings, and litter to build up on the ground. Where there were trees, the banks were becoming well stabilized.

Discussion

Standard roadbank planting practice has been to give the sod a full year to develop before planting with trees. This may prove to be a wise practice where washing is a serious problem. However, a delay in planting means increased competition from grass for soil moisture.

Pines do a good job of controlling erosion, and,

unlike grasses, do not need repeated fertilization to maintain a good cover on roadbanks. Other reasons for using trees there are to reduce mowing area, screen distracting views, abate noise, reduce headlight glare, delineate curves and points on intersections, screen out sun in areas where it might blind motorists, reduce wind velocities, and help control weather and its elements. Trees also provide shade in rest areas and have esthetic values.

Trees for roadbank stabilization must be planted in carefully selected areas lest they interfere with safety features and drainage. Adjacent land use must be considered. Topography is important; trees along east-west highways may hinder highway de-icing.

Growth may be slow at first and survival poor because of the severe grass competition caused by fertilization. While trees are developing, the roadbanks have a weedy look which they soon outgrow (see fig. 2). Tipmoth attack makes pines unattractive for a time.

The susceptibility of roadbank plantings to fire damage has been the biggest management problem so far. Thinning is required, and this may lead to ice damage, especially with open-grown loblolly.

Suggestions

Superior survival on north aspects and where posthole planting was used indicates that lower planting rates (wider spacing) can be used in these cases than on southern aspects or where planting, bars are employed. Present prescriptions call for spacing pines 6 X 6 feet on roadbanks that have been sloped at least 2:1 and previously stabilized with grass.

Results of this study suggest that prescription planting of roadbanks is highly practicable. Suggested practices, based on somewhat limited experience, follow:

All roadbanks to be planted with trees should have a slope of at least 2:1 with 3:1 or even 4:1 sloping advisable on unstable soils.[2] Mulching, fertilizing, and seeding with grass should precede tree planting. It is not necessary for a sod to form. Trees planted in a mulch will survive better than those planted in sod. Mulching should be at the rate of 2 tons per acre (4 tons per acre on highly erosive sites) .

Tree spacing on roadbanks should be governed by the slope and aspect. The following spacings are proposed with the knowledge now available:

Slope	*Spacing (feet)*	*Aspect*
2:1	6 x 6	North, East
	5 x 6	South, West
3:1 or less	6 x 8	North, East
	6 x 6	South, West

[2] On the interstate highway system, standard cut and fill sections are considered to be 2:1 unless extreme soil conditions are encountered. Unstable soils are given 3:1 and 4:1 slopes.

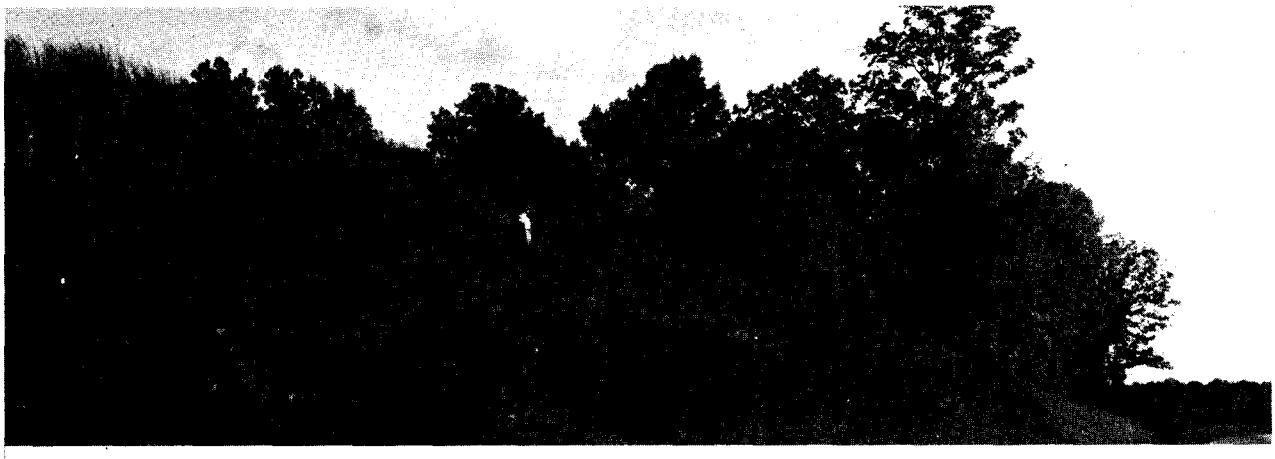

Figure 2.—Loblolly pine after three growing seasons on the south aspect of a roadcut.