the question of adequate stocking

Pine planting programs must allow for seedling survival and plantation losses

HAMLIN L. WILLISTON
Yazoo-Little Tallahatchie Flood Prevention Project
USDA Forest Service

The Southern Forest Resource Council's report, *The South's Third Forest,* called for planting or direct seeding with pine 30 million acres of forest land by 1985 and replanting, after harvest cuts, an additional 30 million acres by the year 2000. Only during the Soil Bank years of 1958-1961 has planting in the South exceeded I million acres a year. To adequately plan for such a broad planting goal, some idea of seedling survival and loss of pine plantations in their pre-merchantable years is needed. Some applicable data is available from records kept on the plantations established by the Yazoo-Little Tallahatchie Flood Prevention Project in north Mississippi.

Survival

Since 1948, the Flood Prevention Project has planted 605,201,000 pine seedlingsmostly loblolly-on 508,793 acres of private land to stop erosion and to slow run-off. It is true that these sites are rougher than average, but . close supervision and continued updating of the planting operation through research have resulted in what we believe is a better than average planting job. Even so, first year survival overall has averaged only 71 percent since 1955 when statistically sound checks were begun. Dry summers, prolonged winter cold spells, animal damage, etc., have resulted in erratic survival as shown in the following tabulation.

To obtain minimum stocking of 500 1-year-old seedlings, it has been necessary to use 94,172,000 seedlings (15.6 percent) in re-planting 114,266 acres (22.5 percent). Over a 9-year period, seedlings planted after February had a 2 percent better survival rate than those planted in December and January. Survival rate of

Planting season	Survival percentage at end of 1st growing season	Planting season	Survival percentage at end of 1st growing season
1954	36	1962	77
1955	77	1963	76
1956	58	1964	73
1957	84	1965	71
1958	64	1966	55
1959	76	1967	82
1960	70	1968	69
1961	90	1969	79

understory plantations was 4 percentage points better than for open field plantations perhaps because the fields are more seriously eroded than the woodlands.

Losses

Causes for mortality include drought-57 percent; unknown-15 percent; browsing and trampling by cattle-9 percent; improper planting-5 percent; adverse site-4 percent; heavy grass competition-3 percent; late release-2 percent; rabbit or rat damage-2 percent; fire-1 percent; insects-1 percent; and all other-1 percent.

During the last 3 years, we have checked 3,875 plantations (66,095 acres) which were 15 years or older. Some 19 percent of these plantations with 15 percent of the total acreage have been destroyed. Despite their dubious merchantability, 43 percent of those lost have been clearcut for posts or pulpwood, 28 percent cleared for pasture, 12 percent destroyed by fire, and 7 percent have failed because of lack of release from hardwood competition. Reasons for the loss of the other 10 percent include road construction, lake construction, housing project, row cropping, logging operations, power line right-of-way, installation of a gravel pit, and kudzu invasion.

From the above, it is obvious that any large-scale planting program on privately owned lands must consider the immediate need for replanting failures and the later loss of some acreage before it reaches profitable merchantability. To get adequate stocking on all acres planted, we should plan on using about 15 percent of the seedlings available for replanting first year failures, and count on a loss of about 15 percent when forecasting volume of wood production.

direct seeding black cherry:

Some Recommendations for the Allegheny Plateau

Reliable methods of direct seeding black cherry are needed to provide artificial regeneration on areas that do not restock naturally. Some suggested techniques are discussed in this article.

By HAROLD J. HUNTZINGER
Associate silviculturist
Northeastern Forest Experiment Station USDA Forest Service

Although much is yet to be learned, our studies show that direct seeded black cherry will attain heights of 8 feet or more in 4 years under favorable conditions. Proper seed handling, covering the seed with soil to about 1 1/2 inches, control of weed and grass competition, and protection from damage by deer are critical requirements for good establishment and growth.

Where to Sow

Direct seeding of black cherry is most successful in cutover forest areas of the mixed hardwood type. It is not always required after cutting. Many stands will regenerate naturally, especially those that have abundant advanced seedling regeneration established on the area before cutting. But in areas where advanced regeneration is lacking or sparse, natural regeneration may prove inadequate. If so, direct seeding of fast growing and valuable black cherry may be desirable.

Old abandoned fields or large forest openings that have grown up to grass and weeds should be avoided in direct seeding. Black cherry seedlings can be established on these sites, but will grow very slowly unless intensive measures are taken during the first several years to control grass and other forbs. Black cherry seedlings established in an old plowed field near Warren, Pa., in 1960 averaged only 18 inches in height after 7 growing seasons. Competition with weeds, plus a small amount of deer browsing on these unfenced plots, severely limited height growth. Under these old-field conditions, many years will be required to *grow a* pole-size stand of trees.

When to Sow

Either fall or spring sowing will result in good germination, if seed is sown early-late September to October 1, or late March to April 15. Any delay beyond these dates will result in reduced germination on the Allegheny Plateau.

Seed can be sown either before or after timber harvesting. Sowing before cutting saves time and effort, since no slash interferes with the operations. And seedlings