

DIRECT SEEDING OF SHORLEAF PINE

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EXTENDED ABSTRACT

Direct seeding is a potentially viable method for regenerating shortleaf pine, but it has not been used extensively. In Missouri, an estimated 10,000 acres have been direct-seeded with shortleaf pine; half of which are at Mark Twain National Forest. Direct seeding offers a flexible and efficient alternative to planting as a way to restore shortleaf pine in the Ozarks. The poster reviews the potential use of direct seeding for shortleaf pine restoration in Missouri.

Direct seeding affords many advantages, including: 1) initial costs are reduced; 2) natural root systems are developed on site; 3) transplant shock is avoided; 4) seeding is easier on sites with limited access, difficult terrain, or rocky, shallow soils; 5) it can be done during different times of the year (unstratified seed is sown in autumn; stratified seed is sown in late winter or early spring); and 6) it can be used to supplement natural regeneration in an area where few or no seed trees exist. Potential limitations of direct seeding include: 1) a large amount of seed is required; 2) low seedling survival rates; 3) reduced control over spacing of trees; 4) costly pre-commercial thinning; 5) potential for seed loss due to predation and rain washout; and 6) severe competition with other vegetation. Early growth of seeded seedlings is lower than that of planted seedlings (Fig. 1, Brunk 1977).

Proper seedbed conditions are critical for germination and survival of direct-seeded shortleaf pine. Shortleaf pine direct seeding is most successful on exposed mineral soils with sufficient light. Fire or mechanical disturbances are effective site-preparation methods. Seedlings were prohibited from establishing on litter depth exceeding 3 inches (Fig. 2, Grano 1949) and at least three times as many seedlings emerged on burned sites as on unburned sites (Fig. 3, Boggs and Wittwer 1993).

The following is recommended when sowing shortleaf pine seed: 1) treat seeds with repellents to prevent predation; 2) sow half a pound of shortleaf pine seed per acre; 3) mix pine seed with wheat seed (40 lbs per ac) to spread the pine seed evenly; 4) sow seed in spots or rows; or broadcast mechanically, by hand, or aurally.

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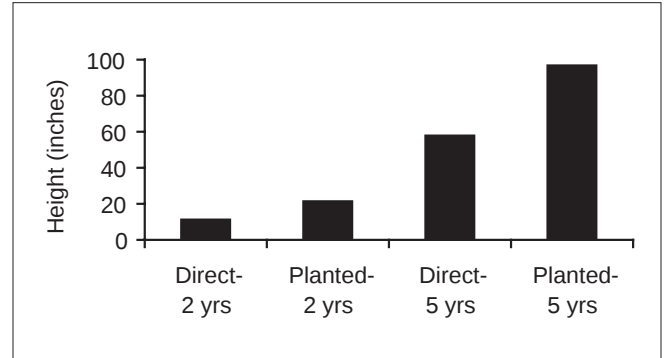


Figure 1.—Comparison of direct seeded and planted seedlings at Indian Trail Conservation Area, Dent County (Brunk 1977).

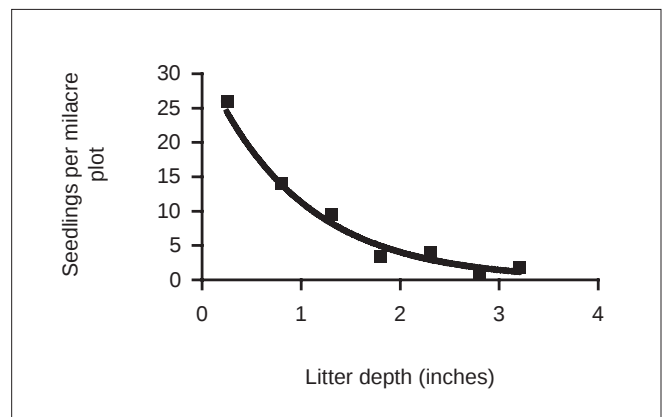


Figure 2.—Relationship between average litter depth and establishment of pine seedlings (adapted from Grano 1949).

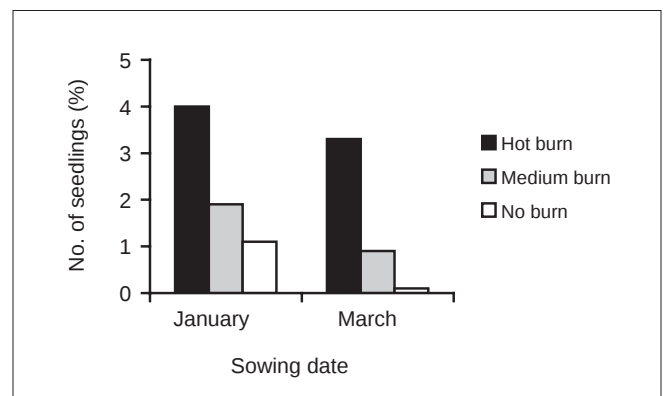


Figure 3.—Number of established seedlings as a percentage of seeds sown (Boggs and Wittwer 1993).

The first year is the most critical for establishment and survival; mortality after the first year is low. Establishment is best if a small amount of overstory shade is present to prevent desiccation. However, the species becomes less shade tolerant with age and benefits from a reduction of canopy cover and release of competition with understory vegetation once it is established. Inventories are recommended during summer and again at the end of the growing season in the first year: minimum acceptable is 1,400 seedlings per acre at the end of the first growing season.

Direct seeding is a simple, fast, economical, and flexible method that can supplement natural shortleaf pine reproduction or regeneration. It has the potential to make a significant contribution to shortleaf pine restoration efforts in the Missouri Ozarks.

LITERATURE CITED

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