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Successful Planting of Shortleaf Pine

Shortleaf pine is one of four major southern yellow pines found in the forests of NC. Its wide range across 23 states indicates an adaptability to a great variety of soil, site and climatic conditions. While once found across all of North Carolina shortleaf pine is more predominant and grows best in the Piedmont and mountain regions. In spite of its adaptability, shortleaf pine is in decline across North Carolina.

Successful artificial regeneration of shortleaf requires planting high quality bareroot or container seedlings, selecting a suitable site, applying adequate site preparation, conducting proper planting techniques, and effectively controlling competition. The tree's unique biological characteristics also affect planting success. Careful planning is important.

Key Regeneration Factors

Adapts to a wide variety of soils, but shortleaf ...

- ✓ Is most competitive on drier, better-drained, less fertile sites.
- ✓ Does not grow well on soils with high calcium, high pH, or excessive drainage.
- ✓ Has a low tolerance to poor soil aeration and so does not tolerate dense clay or poorly drained soils well.
- ✓ Has a low demand for nutrients and so can survive and grow well on poor sites.
- ✓ Is not found at elevations greater than 3,000 feet.

Shortleaf seedling survival is hampered...

- ✓ By slow early growth due to the development of a large, deep taproot that allows it to exist on poor sites.
- ✓ By the location of its small feeder roots that are most abundant in the soils top few inches. Hence, when dry conditions prevail and the vegetation's wilting point is reached, shortleaf pine surface roots succumb early.
- ✓ On shallow, rocky and dry soils where it has a competitive advantage over other species.
- ✓ By competition. Shortleaf is shade intolerant and does not grow well when suppressed. However, shortleaf does endure competition longer than loblolly and will respond to release (even when mature).



Fig. 1. The double crook rooting habit of shortleaf pine is a common and desirable characteristic of seedlings. It is a good indicator of genetic purity distinguishing it from loblolly/shortleaf hybrids



Fig. 2. A successful shortleaf planting at Tuttle Educational State Forest in Caldwell County, NC. Bareroot seedlings were planted in March after a late summer prescribe burn was conducted.

Plan for Success

1. Pick the right site. Shortleaf likes well-drained sandy or gravelly clay. It does not compete well on wet or compacted soils.
2. Prepare the site well before you plant. Since shortleaf pine grows slow for 2-3 years after planting competition control is important. Pastures, agriculture fields, and high quality sites require the most intensive site preparation.
3. Container vs. bareroot seedlings: Hand-planted, container-grown seedlings survive better than bareroot seedlings.
4. Choose an experienced tree planter. Shortleaf is sensitive to improper handling and poor planting. Use a refrigerated unit to store for extended periods.

First Things First - Choose the Right Site

Shortleaf is favored on medium to poor sites where other species are unable to compete.

- South and West aspect - (poor soil moisture).
- Thin, rocky soils - (drier, nutrient deficient).
- Elevations 600 – 2,500 feet, North and West of loblolly range.
- Sites too dry, warm, infertile for eastern white pine.
- Competes well with Oaks on sandy mountain soils.

Littleleaf Disease is a Serious Threat

- Reduces growth rates and causes mortality.
- Recognized by abnormally short, sparse, slightly yellowing needles, thinning crown, and branch dieback.
- Several factors such as root fungi, poor soil aeration, low fertility, nematodes, and toxic levels of manganese, combine to impede nitrogen absorption.
- Shortleaf is susceptible to Littleleaf on clay soils that are severely eroded, poorly drained, infertile, and have poor aeration. Avoid planting shortleaf on these sites.
- Maintain stand health and vigor through fertilization and thinning.



Fig.3. A shortleaf tree showing the symptoms of Littleleaf disease. Credit: Terry Price, GFC

Site Preparation is the Key

Identify the factors that limit establishment and growth on your site and select a site preparation method that removes those limiting factors. Apply intensive site preparation methods to control competing vegetation to increase seedling survival and early growth. The most effective tools for site preparation include applying herbicides, scalping, chopping, burning, and bedding. On pastures and agricultural fields apply herbicides to control grasses and weeds and subsoil to break up plow pans or compacted soil that inhibit root development.

Planting Dos and Don'ts

Do hire an experienced and well-supervised tree planting crew.

Do plant early. Shortleaf pine can be planted from October through February. Late planting in March or April becomes increasingly more risky and is not recommended.

Do handle the seedlings carefully. Shortleaf root system is sensitive to rough handling and exposure to sun or wind.

Do not store bareroot seedlings for more than 60 days. Containerized seedlings store better, but should be planted as soon as possible after lifting. Keep stored seedlings from over heating or freezing.

Competition Release after Planting

Conduct an annual inspection in late March or early April to determine the need for competition release. Seek advice for the right herbicide and application rate for target weed(s). Ask a knowledgeable forester, N.C. Forest Service county ranger, or forestry herbicide representative to visit your site for specific recommendations.



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