

Promoting Wind Firmness in Saplings

Sapling wind firmness is a problem in longleaf pine stands originated from container stock but not bareroot stock. After planting, new roots initiate from the taproot end. These vertically oriented new roots (“sinkers”), along with taproots provide vertical anchorage. In certain circumstances (such as poor planting), some of these new roots extend horizontally. Also, seedling taproots maybe deformed during nursery culture. Saplings with malformed root systems are vulnerable to toppling by wind or ice storms.



Three-year-old seedlings with vertical sinker roots (L) and a deformed taproot (R).



(L) A 7-yr-old sapling impacted by a tropical storm three months earlier. (R) A wind-topped 7-yr-old sapling showing its oblique taproot and uneven lateral root architecture (R).

For More Information
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CONTAINER-GROWN LONGLEAF PINE SEEDLINGS



RESTORING AND MANAGING LONGLEAF PINE ECOSYSTEMS

RESTORING LONGLEAF PINE WITH CONTAINER-GROWN STOCK

More than 75% of longleaf pine seedlings produced are container stock. Compared to bare-root stock, container-grown seedlings generally have higher first year survival but are less wind firm. Stock quality and site conditions can keep some seedlings in the grass stage for several years. Unit scientists are investigating the effects of seedling container cavity type and volume and nursery fertilization regime on seedling root development, stock quality, early field performance, and sapling wind firmness.



(L) A 7-yr-old grass stage container seedling. (R) A 16-yr-old seed orchard tree lacking vertical root anchorage was toppled by a mild tropical storm.

Knowing When to Cull Seedlings

Cull seedlings with taproots readily visible on the root plug surface. In these, lateral roots do not radiate from the taproot circumference evenly. This condition persists for many years.



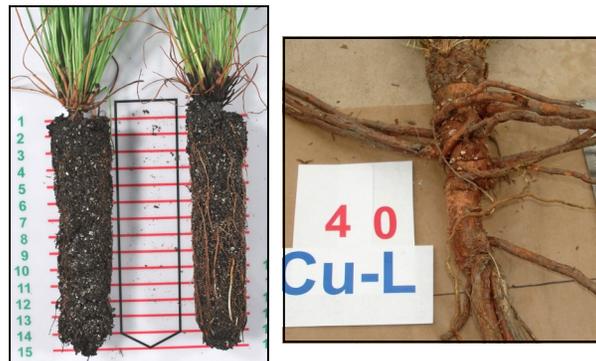
A 6-wk-old (L) and 26-wk-old container seedlings with taproots visible (C). Uneven lateral root architecture in a 2-yr-old seedling (R).

Reducing Lateral Root Deformity

Most of container longleaf pine seedlings are grown in ridged cavities to stop lateral root spiraling by vertically training the lateral roots. Growing seedlings in cavities lined with a low-level copper compound further reduces lateral root deformity.



The cage-like lateral root architecture of container stock (L) persists for many years (C). In the field, some lateral roots extend from the bottom of the root plugs and do not explore the nutrient rich top soil layer (C and R).



(L) Root growth inhibition by copper during nursery culture is only temporary (L: copper plug; R: non-copper plug). Once seedlings are planted, the lateral roots resume growth and extend horizontally into the top soil layer (R).

Improving Early Field Performance

Seedling emergence from the grass stage and early growth can be improved with increasing cavity size or nursery fertilization rates. Between 25 and 50% of container-grown seedlings, cultured in larger cavities with normal or double fertilization rates, emerged from the grass stage during the first field season in central Louisiana.



A comprehensive study of container type and cavity volume, nursery fertilization rate, and site preparation was established in the field 21 months ago.

Continuing Superior Performance

The positive effects of increasing cavity volume and copper lining on longleaf pine seedling growth and root system architecture persist for many years.

