North Carolina Forest Service
FORESTRY Leaflets
August 2023 *FM-21*

Loblolly Pine Minimum Winter Temperature (MWT)

The North Carolina Forest Service (NCFS) requires that all loblolly pine seedlings, planted under a cost-share program, have a seed source origin ≤ 8 degrees of Minimum Winter Temperature (MWT) from the planting site. Five degrees of movement is more conservative and may lead to better seedling survival.

The Loblolly Pine Performance Rating System (**PRS**®) allows the buyer of loblolly pine seedlings an easy way to assess the genetic potential of specific loblolly pine families. However, growth potential must be combined with the proper seedling deployment to prevent excess seedling mortality. Seedlings moved from warmer regions to colder regions (south to north or east to west) will often grow faster than local seed sources but will often incur increasing mortality due to poor cold weather adaptation. The pursuit of seedling growth, while ignoring seed source origin or regional adaptation can result in excess mortality.

Average minimum winter temperature is commonly used by horticulturalists and forms the basis of the USDA Plant Hardiness Zones. R. C. Schmidtling's research (USFS, General Technical Report SRS-44) indicated that loblolly pine could be safely moved 5 degrees, and possibly to 10 degrees, yearly average minimum winter temperature (MWT). The degrees of seedling movement are calculated with the following formula:

MWT of loblolly source family - MWT of planting site = Degrees of Movement

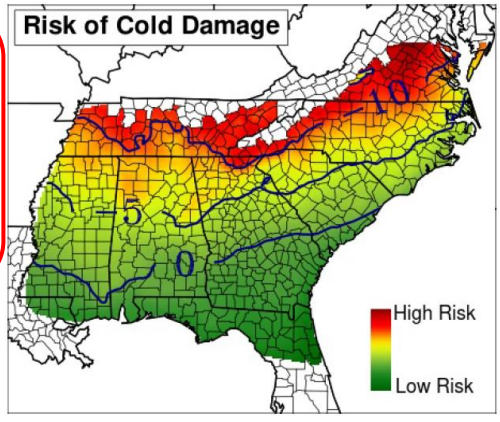
The MWT of <u>the nursery</u> where seedlings are grown <u>is not of first importance</u>. What matters is the MWT where that seed source was originally collected . . . where that mother tree originated. This information is available for all commercially available improved loblolly pine families. See the PRS excerpt below.

Loblolly pine seed sources can be deployed in a county having an average minimum winter temperature (see following page) up to 5° F below that of the loblolly seed source with minimal risk of cold damage. If loblolly pine seed sources are moved to colder areas, mortality may increase. Anything beyond 8 degrees of movement is very risky. Movement beyond 10 degrees is very likely to result in planting failures.

Most loblolly pine seedlings are sold as Coastal (ex. "Coastal NC") or Piedmont (ex. "Piedmont NC"). These designations are helpful but should not be followed strictly. MWT is a far more valuable guide to determining where to deploy loblolly pine seedings. In many cases "piedmont" seedlings may be more appropriate in the northern coastal plain than are seedlings sold as "coastal." Many "coastal" loblolly families originated in South Carolina or Georgia and are at or beyond 8 degrees of movement when planted at the Virginia border.

The minimum winter temperature "origin" of Family **16C3C010** is 15.79°F (0° line). Planting in the green shaded areas on the map up to 5°F colder (south of -5° line) has minimal risk of cold damage[1]. Planting in areas that are 5-10°F colder than the origin (between -5° and -10° lines) will increase the risk of cold damage. Areas that are more than 10°F colder than the origin are too cold and planting is not advised (north of -10° line).

Family **16C3C010** has been tested by members of the *NC State University Cooperative Tree Improvement Program*.



North Carolina County
Minimum Winter Temperature (MWT)

- 0-3 Degrees MWT
- 3-5 Degrees MWT
- 5-8 Degrees MWT
- 8-10 Degrees MWT
- 10-13 Degrees MWT
- 13-15 Degrees MWT

Updated 8/7/23

FM #21