

10. DROUGHT HARDY TESTS OF LOBLOLLY PINES

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During 1951, a study was initiated to determine if drought hardy strains of pine could be found that would improve survival and growth on droughty planting sites. Need for this work is critical, especially in the Western Gulf Coast Region where there have been widespread plantation failures as well as losses in older plantings in dry years such as 1951 and 1954. Some landowners have about given up planting as a hopeless task. Although it is hard to get a stand of pine trees started on these critical areas, once the trees are well established their growth rates, and the per acre yields are very satisfactory.

The approach to the drought problem was three pronged: i.e., by selection of what appeared to be drought hardy strains; by hybridization, combining drought hardiness with other desirable characters such as fast growth; and by testing introductions from regions of low rainfall and high temperatures, especially from Mexico and the Mediterranean countries. The tests were started at an ideal time since 1953 was quite dry and in our area the drought of 1954 was severe. These two years gave ideal conditions for making tests of drought hardiness.

The results reported here are for the selection phase of the work, which was concentrated on loblolly pine. Although the research is not yet complete, very interesting results have been obtained. The presence of drought hardy pine strains can hardly be doubted after the past three years' research, but it still remains to be seen how the growth of the apparently drought hardy strains compares with that of loblolly pine from other sources.

We in Texas have "made-to-order" conditions for selections of drought hardy strains of loblolly pine. Beyond the western edge of the Southern Pine Region there are found isolated islands of pine growing under conditions of low rainfall and high temperature. These "Lost Pines", as they are called, are found up to 120 miles west of the Southern Pine Region, growing under rainfall of 25 to 45 inches, depending on the year. Temperatures are high. Rainfall often comes as heavy showers of short duration, and soils are for the most part rocky and poor. Altogether conditions are very severe.

From this area eight open pollinated selections were made from different sites in three separate Lost Pine stands. The following discussion with slides will show the survival differences between the progeny from the Lost Pines and from the more Eastern check material. Tests were replicated on six different areas for three years, two replications being made each year when stock was available. Four of the test areas were located in the Post Oak Region, in deep sands, on droughty sites, in low rainfall areas. The other test areas were in the East Texas Pine Region at our main research area at Fastrill and at Many, Louisiana. A subsidiary test at Millard, Mississippi, showed the same pattern of survival.

Conditions on all test areas were very severe in 1954 and in some during 1953. To illustrate the severity in 1954, there was no measurable rainfall from May 26 to early in October. During this time temperatures were high, often over 100° F and several times were over 110°F. The survival pattern for this area is shown by the following table of survival:

Florida source	8%	
North Carolina source	22%	
Two Louisiana sources	62%	
Texas sources		
Bastrop County	88%	} Lost Pine sources
Fayette County	80%	
Another Bastrop source	100%	
Angelina County	75%	(Western edge of Southern Pine Region)

(The slides presented showed what happened in other test areas. Too severe conditions finally killed everything, but the drought hardy strains remained alive several weeks longer than the checks, which ordinarily would be long enough to catch a rain.)

The results just presented to you by graphs certainly look encouraging. They are not the whole answer, however, and only additional tests and more time will give a final answer. Two questions need to be solved: i.e., do we have drought resistant strains and if we do, what kind of trees will they produce? The first is partially answered, as the graphs show. The second is being answered. To date the drought hardy stock has grown as well as any stock tested. In fact, in many cases it is better. As Ray Goddard expressed it, "It appears that the drought hardy stock not only can survive, but also can continue to grow under severe conditions." Questions as to limb form and other characteristics of drought hardy trees can only be answered in the future as the plantations come closer to maturity.

Some one might object that we are testing only geographic races. To see what might happen within an area, seeds were collected from a moist, a dry, and an intermediate site in the Lost Pines. Lack of seed crops has prevented a follow-up, but in the 1953 tests the seed collected from the dry sites in both Bastrop and Fayette Counties produced seedlings that survived better than those collected from the moist sites. This pattern was repeated in five of the six test areas-- in the sixth, survival was equal. Such local race tests are incomplete, but have yielded interesting results in their early stages.

It certainly appears that loblolly pine has certain "strains" that can tolerate more drought than others.