Seed Source Comparisons in 100 Tests in Arkansas and Oklahoma

Lou Anne Dill and Clem Lambeth[1]

Keywords: Seed source, regression

INTRODUCTION

Weyerhaeuser Company has planted non-local seed sources of loblolly pine in southwest Arkansas and southeast Oklahoma for nearly 30 years. In an effort to further study the benefits and risks of using nonlocal material, seed sources were compared in 100 tests (ages 4 to 22 years) planted in the region between 1974 and 1994. Many of these trials are progeny tests of nonlocal seed sources that have local seed source check lots included. They form the foundation of a land race of seed sources from east of the Mississippi River.

METHODS

Mean volume per live tree, volume per planted tree, survival, site index, sweep and ice damage of nonlocal seed sources and unimproved local seed source were evaluated by running regressions against Arkansas/Oklahoma improved material for each of these traits. Slopes and intercepts of these plots were used as indicators of general performance trends. There were 100 tests with measurement ages of 4 to 22 years.

Seed sources:

Arkansas/Oklahoma Improved (AR/OK Imp)	Seed orchard mix of 10 parents
Arkansas/Oklahoma Unimproved (AR/OK)	Unimproved check lot
North Louisiana (N LA)	Unimproved check lot
North Mississippi (N MS)	Combination of two unimproved check lots
North Carolina Improved (NC Imp)	Combination of improved parents

Traits:

- Site Index (ft – based on 25 years)
- Sweep - % trees with sweep less than 4cm (this is the deviation from a straight edge in the first 4m of the stem)
- Ice Damage - % trees with ice damage (this damage is mostly from the 2000 ice storm, probably the worst storm in recorded history for this area)
- % Survival (after establishment through latest measurement)
- Volume per Live Tree (dm^3)
- Volume per Planted Tree (dead = 0 volume)

---

[1] Database Manager and Southern Tree Improvement Manager, respectively, Weyerhaeuser Company, Hot Springs, AR.

Early mortality was dropped when it was available. "Mortality the first year after planting is affected by several factors, which may or may not be provenance-related: e.g., seedling conditioning in the nursery, planting quality, insect damage, and moisture stress. Generally, when overall conditions are good for survival, provenance effects are small."(Lambeth, *et al.* 1984)

RESULTS

Results showed the North Carolina material was slightly straighter than the local seed source (Figure 1) but had slightly lower survival (Figure 2) (on a few sites) and slightly higher ice damage (Figure 3). Site Index (Figure 4), volume per live tree (Graphs 5 and 6), and even, volume per planted tree (Graphs 7 and 8) were clearly superior to the Arkansas/Oklahoma material. However, gain for volume per planted tree, which is a reflection of growth and survival, was lower than that for volume per live tree (Table 1).

Tests < 10-Years-Old		Tests > 10-Years-Old	
Volume Live Tree	Volume Planted Tree	Volume Live Tree	Volume Planted Tree
1.32	1.31	1.24	1.17

Table 1. Regression slopes of NC improved seed source on Arkansas/Oklahoma improved seed source in trials in SW AR and SE OK

CONCLUSIONS

The best overall performance was registered by the North Carolina coastal seed source, which has been the favored source from commercial regeneration for a number of years.

REFERENCES

Lambeth, Dougherty, Gladstone, McCullough, and Wells. 1984. Large-Scale Planting of North Carolina Loblolly Pine in Arkansas and Oklahoma; A Case of Gain Versus Risk. Journal of Forestry. Vol 82, No. 12 736-741.

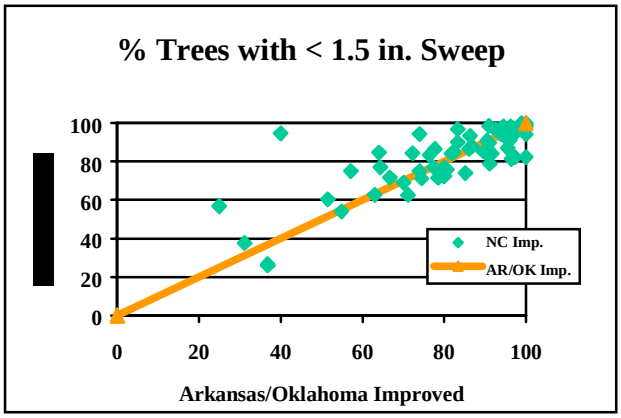

Figure 1. Regression of Sweep of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.

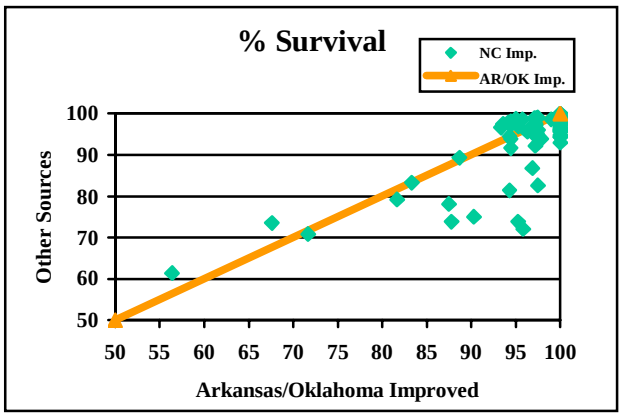

Figure 2. Regression of Survival of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.

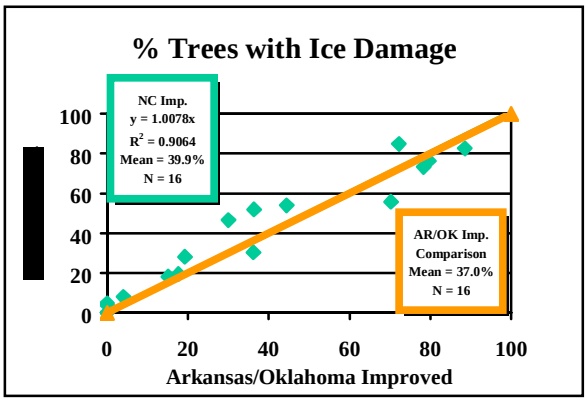

Figure 3. Regression of Ice Damage of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.

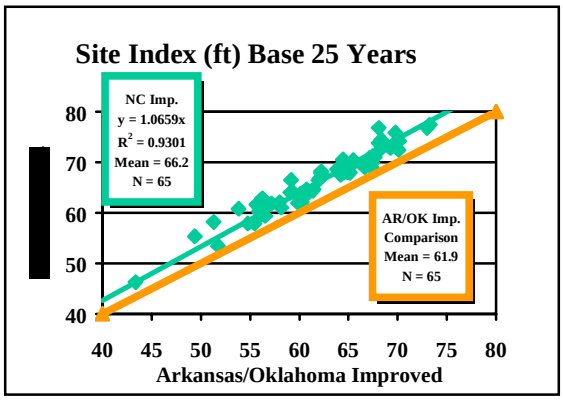

Figure 4. Regression of Site Index of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.

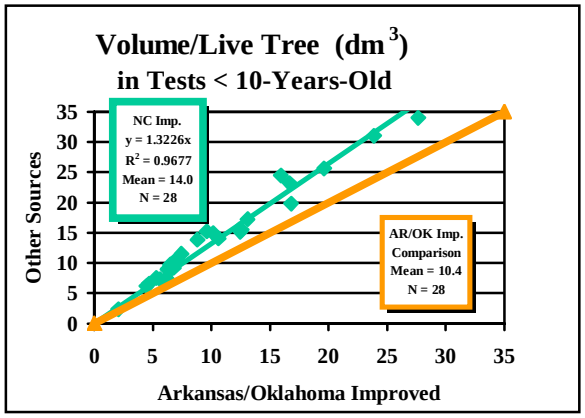

Figure 5. Regression of Volume/Live Tree of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.

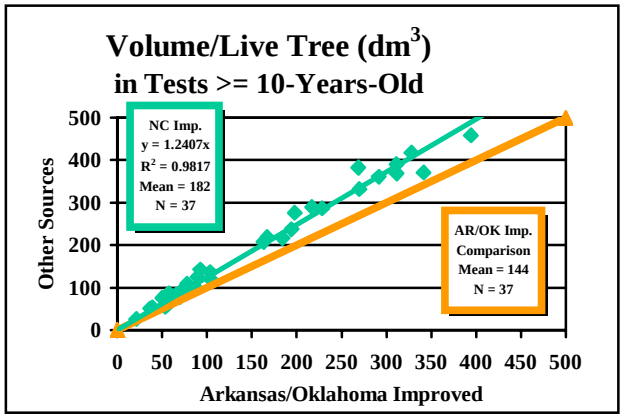

Figure 6. Regression of Volume/Live Tree of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.

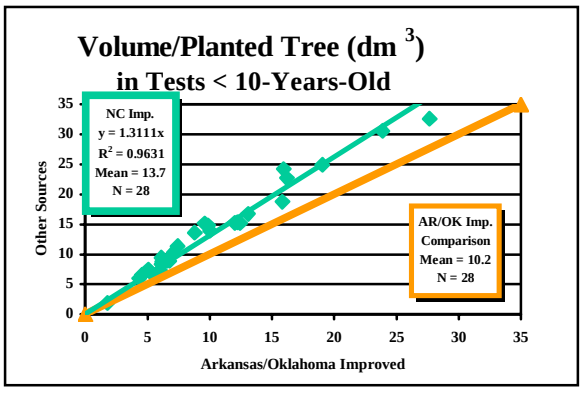

Figure 7. Regression of Volume/Planted Tree of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.

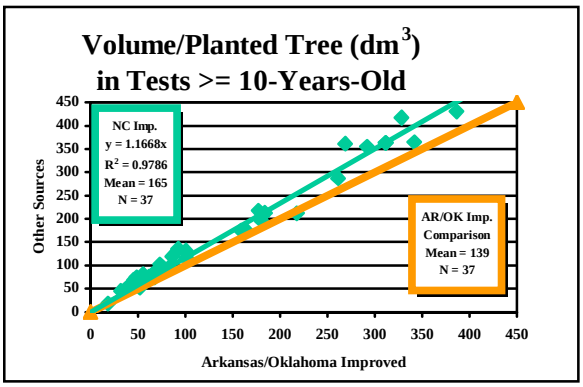

Figure 8. Regression of Volume/Planted Tree of NC improved seed source to the local AR/OK improved seed source in trials in southwest Arkansas and southeast Oklahoma.