PERFORMANCE OF SELECT SLASH PINE FAMILIES IN ARGENTINA AND USA

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Slash pine *(Pinus elliottii* var. *elliottii* Engelm.) is an important commercial species in the southeastern United States, not only within its natural range (Figure 1), but also in central Louisiana and eastern Texas, where it does not occur naturally, but has been widely planted. Slash pine is also successfully grown as an exotic in many temperate, sub-tropical and tropical areas of the world. It grows very well in Argentina. As early as 1971, over 46,000 ha of slash and loblolly *(P. taeda* L.) pine had been planted in Argentina (Barrett 1972).

Slash pine has been included in all the major tree improvement programs in the southeastern US, including the US Forest Service's Southern Region (R-8) Tree Improvement Program. This study documents the growth of progeny from trees selected for the R-8 Tree Improvement Program in Argentina.

A progeny test of 92 open-pollinated slash pine families was established at three locations in the Mesopotamia of Argentina: Puerto Esperanza, Misiones (26.2 ^{0}5); Bella Vista, Corrientes (28.4 °S); and Concordia, Entre Rios (31.4 °S). These latitudes are approximately equivalent to Miami, FL, Orlando, FL, and Savannah, GA, respectively, in the southeastern USA. Controlled-cross progeny of the same families were planted in 49 plantings in north Florida, south Mississippi and central Louisiana between 30 and 32 °N latitude (Figure 1).

All the ortets were selected in Mississippi and Florida by personnel of the R-8 tree improvement program also between 30 and 32 °N latitude except for 4 sources from Marion County, FL from 29 °N. Of the 43 families from Mississippi and 49 families from Florida, 41 were probably from plantations established by the Civilian Conservation Corps in the 1930's. The check lot for the US plantings consisted of several woods-run bulk sources. The check lot for the Argentina plantings was collected from a local (land race) slash pine seed orchard.

After 5 years in the field, the plantations in the US averaged 3.5 m in height, those in Argentina averaged 6.9 m. Height in the northernmost planting in Argentina, Puerto Esperanza, the most tropical location, averaged 7.5 m, whereas the height in the southernmost planting, Concordia, the most temperate location, averaged 6.0 m. Height of the trees in the intermediate location averaged 7.0 m.

Since none of the 49 plantings in the USA contained a substantial proportion of the total number of families, the Best Linear Prediction (BLP) process (White and Hodge 1989) was used to estimate overall heights and compute genetic gains.

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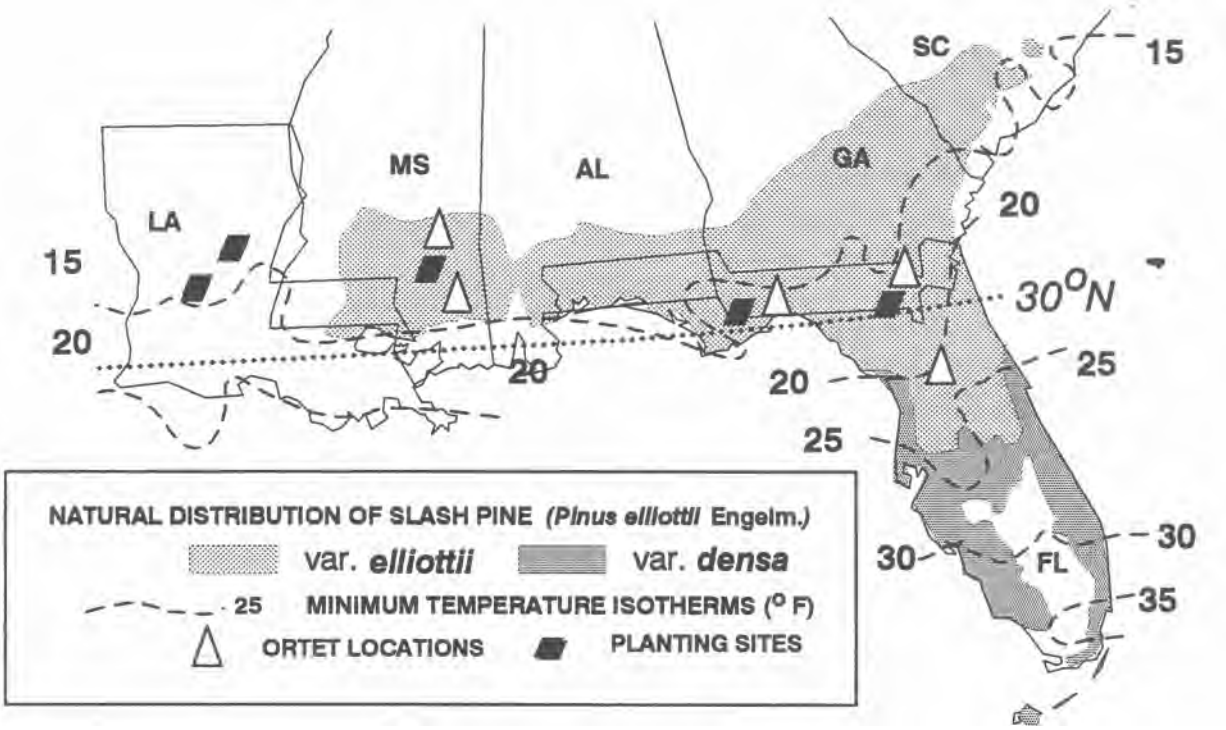

Figure 1. Map of the southeastern United States showing the natural distribution of slash pine and the location of seed sources and progeny tests.

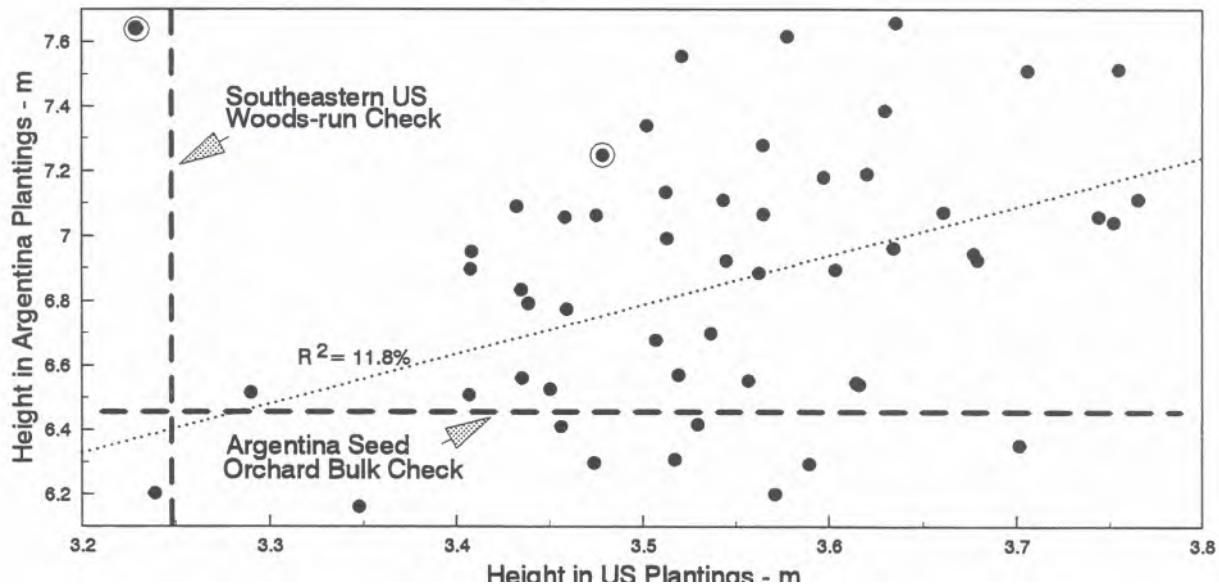

Figure 2. Five-year height growth of slash pine families grown in the Mesopatamia of Argentina compared to growth of the same families in the Southeastern United States. Families from Marion County, FL, are circled.

Height growth of the families in the USA plantings was only weakly correlated with growth of the same families in Argentina (r =0.27, p <0.04) (Figure 2). The correlation was strongest between height in the USA and height in the planting that is presumably the most similar climatically, the more temperate southern planting in Concordia (r=0.42), and weakest with the most tropical planting, in Puerto Esperanza (r=0.17). The correlation was intermediate between family means in height between the USA plantings and the central planting at Bella Vista (r=0.26).

In spite of the poor correlation of performance in Argentina with performance in the USA, substantial genetic gains were obtained in both locations. The average genetic gain in 5 year height in the USA plantings was 14 %. The average genetic gain in Argentina averaged 25 %, even though the check lot was a local seed orchard source. There was some evidence for provenance effects in the present study. Conventional wisdom states that geographic variation within typical (var *elliottii)* slash pine is negligible (Snyder *et al* 1967), but studies where sampling was intense show substantial variation (Squillace 1966). A series of slash pine provenance tests in Argentina have shown that growth varied with minimum temperature at the source (Data from Barrett (1974), re-analyzed by Schmidtling4).

The families in this study originate from about the same latitude just north of 30th parallel except for the four families from Marion County, FL (Figure 1) which are from further south. The USA plantings are all north of Marion County by at least 1° in latitude. The Marion County families average only 3.35 m in height in the USA plantings versus the overall mean of 3.52 m, indicating a possible mal-adaptation to the colder climate. In contrast, the Marion County selections average slightly taller in the Argentina plantings, 7.33 m versus the overall average of 6.86 m.

Using plus-tree selections from the USA for planting in Argentina appears to be a good strategy. Selections from the more southern range of var *elliottii,* but north of the transition to var *densa,* might have the greatest possibilities for use in Argentina. Considering the more tropical nature of the planting sites in Argentina, the *elliottii X caribaea* hybrids which are commonly used in subtropical regions of Australia, may have even greater potential.

[4] Manuscript in preparation.

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