

## Hybrid Pines (Pitch Pine x Loblolly Pine) Studied in the Appalachian Region of Maryland

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*Hybrids of pitch pine x loblolly pine (Pinus rigida x taeda) originating from a cross of pitch pine (P. rigida) of unknown origin with loblolly pine (P. taeda) pollen from Georgia were studied in Garrett County, MD. At 17 years after planting, 53% of the hybrid trees survived; their heights averaged 7.8 m and their diameters (DBH) were 15.5 cm. Pitch pines and loblolly pines native to Maryland planted for comparison had similar heights and diameters, but the loblolly pines showed a high mortality rate—only 19% of the planted specimens survived.* Tree Planters' Notes 39(3):26-27; 1988.

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Pitch pine (*Pinus rigida* Mill.) and loblolly pine (*P. taeda* L.) are two common forest trees of the eastern United States that are native to Maryland. Pitch pine tolerates a cold climate but is a relatively slow growing tree and has only a moderate commercial value. Loblolly pine is an outstanding tree in the southern parts of the State.

In 1962, the hybrids of these two species (*P. rigida x taeda*) were planted in various parts of the State, with an objective to compare them with the parent species, loblolly and pitch pines. The first results of this research

were reported by Genys in 1970 (1). At that time, the 7-year-old hybrids in the Appalachian region were larger than loblolly pines, and all three types of specimens showed an equally good survival. This present report is based on measurements of the same three groups of trees at age 17.

### Materials and Methods

The seed lot of *P. rigida x taeda* was supplied to the author by Dr. S. K. Hyun of South Korea in 1962. The hybrid seeds were harvested from female parent trees *P. rigida* of uncertain origin that had been pollinated by *P. taeda* pollen from Georgia. Seed of *P. rigida* used for comparison were collected at Harmans, MD (near Baltimore). Loblolly pine seed used for the same reason was also of Maryland origin, but its exact provenance was not known.

One-year-old (1 + 0) seedlings of these three sources were produced at the Buckingham State Forest Tree Nursery in Harmans, MD, during the growing season of 1962. Next spring (in 1963) the specimens were planted on 11 sites in various parts of Maryland, including the Appalachian region in Garrett County, near Friendsville, MD. The plantation that is the subject of this report is a former farm field at an elevation of 773 m surrounded by

northern hardwood trees. The soil is rocky and relatively shallow. The growing season in this area lasts only 120 to 140 days.

The research sources were arranged in eight randomized blocks. Plots were 4-tree squares with trees spaced at 2.1 by 2.1 m. Heights and diameters (DBH) of 17-year-old trees were measured in spring 1980. A record was kept of survival rates. In four blocks, all *P. taeda* trees died.

Consequently, the analysis of variance of heights and diameters was based on data from only four blocks, with 3 degrees of freedom (df) for "blocks," 2 df for "varieties," and 6 df for "interaction." Survival analysis included data from all eight blocks. Student's ranges were used for estimation of the least significant differences (LSD).

### Results

Survival and growth rates of *P. rigida x taeda*, loblolly pine, and pitch pine were studied for 1 year in the nursery and 16 years in western Maryland (table 1).

**Survival.** Pitch pine and the hybrids showed similar survival rates, 66 and 53%, respectively. Of the loblolly pines, from 32 trees planted only 6 (19%) survived. This low survival rate of *P. taeda* was significantly (0.05 level) different than that of pitch pine or the hybrids (LSD = 31 %).

**Table 1**—Data on survival and growth rates of pitch pine (*Pinus rigida*), loblolly pine (*P. taeda*), and hybrids (*P. rigida* × *taeda*) at 16 years after planting in Appalachian region of Maryland at Savage River State Forest, Garrett County

Seed ID	Biotype and origin	16-yr Survival (%)	17-yr Height (m)	17-yr DBH (cm)
119	<i>P. rigida</i> (Maryland)	66	8.18	15.3
80	<i>P. taeda</i> (Maryland)	19	7.92	14.1
156	<i>P. rigida</i> × <i>taeda</i> F <sup>2</sup>	53	7.77	15.5
LSD at 0.05 level		31	NA	NA
F-value		11.8**	0.10	0.3

\*\*Significant at 0.01 level.  
DBH = diameter at breast height.

**Height.** On the average, the three types of pines at 16 years after planting were about 8 m high. *P. rigida* × *taeda* hybrids, were about 7.8 m tall, and pitch pines were the tallest (8.2 m) high. However, the heights of these three sources were not significantly different at 0.05 level. Apparently, at this age, the height of hybrids was similar to that of the other sources, and their superiority of growth rate observed at the age of 7 years was no longer evident (1).

**Diameter (DBH).** The diameters of the three types of pines ranged from 14.1 to 15.5 cm but did not differ significantly at 0.05 level. It is noteworthy, however, that loblolly pines, which were about the same height as the hybrids and pitch pines, had the smallest diameters. Their stems

appeared more slender and their limbs smaller than among the specimens of *P. rigida* or *P. rigida* × *taeda*.

#### Discussion

Excellent results with *P. rigida* × *taeda* hybrids were obtained in South Korea (2, 3). In Maryland, these hybrids grew more slowly than *P. taeda* within the *P. taeda* range, but they may be valuable in areas of colder climate (1, 4).

The results of this study in Maryland's mid-Appalachian region showed that 17-year-old trees representing pitch pine, loblolly pine, and *P. rigida* × *taeda* hybrids grew in height at the same rate and had similar diameters. The major difference among the sources was in their

ability to survive in the Appalachian region. Although pitch pines and hybrids showed a satisfactory survival, loblolly pines did not (only 19% survived).

Planting this particular source of hybrids (a cross of *P. rigida* of unknown origin pollinated by *P. taeda* from Georgia) in the mid-Appalachian region promises no economic advantages. There is, however, a strong possibility that hybrids resulting from crosses of selected Maryland sources would be more outstanding.

#### Literature Cited

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