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HYBRID MAHOGANY RECOMMENDED FOR PLANTING IN THE VIRGIN ISLANDS

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SUMMARY

A hybrid mahogany has a reputation in the United States Virgin Islands of combining the drought resistance and wood quality of West Indies mahogany with the faster growth of Honduras mahogany. A replicated trial on eleven sites tested the drought resistance and growth of hybrid, Honduras, and West Indies mahoganies. Ten years after planting the hybrid has survived and grown more than either parent species. We recommend the hybrid mahogany for plantations in the Virgin Islands except on very dry sites.

RESUMEN

Un híbrido de caoba tiene el prestigio en las Islas Vírgenes de los Estados Unidos de combinar la resistencia a la sequía y la calidad de la madera de la caoba dominicana con el crecimiento rápido de la caoba hondureña. Pruebas replicadas en once sitios probaron la resistencia a sequía y el crecimiento del híbrido entre la caoba hondureña y la caoba dominicana. Diez años después de plantado, el híbrido ha sobrevivido y crecido más que cualquiera de las especies progenitoras. Recomendamos la caoba híbrida para plantaciones en las Islas Vírgenes, excepto en sitios muy secos.

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INTRODUCTION AND METHODS

A natural hybrid (2) between Honduras mahogany (*Swietenia macrophylla* King) and West Indies mahogany (*Swietenia mahagoni* Jacq.) in the United States Virgin Islands reputedly combines the drought resistance and wood quality of West Indies mahogany with the faster growth of Honduras mahogany. The hybrid is recognized by leaves and fruits intermediate in size to those of the parents (Figure 1)

In 1960 a replicated trial of the three mahoganies was planted on eleven sites in St. Croix to test for drought resistance and growth, and to determine if mother tree species is important in hybrid seed collection. Half of the hybrid seedlings originated from seed collected from Honduras mahoganies and half from West Indies mahoganies. Flowers on the mother trees had been naturally cross-pollinated by the other species and hybrid seedlings were selected in the nursery by leaf size. Hybrid seed can also be collected from hybrid trees, but such seed was not tested.



Figure 1. — Comparison of the leaves of Honduras (left), hybrid (center), and West Indies (right) mahoganies.

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^{2/} In cooperation with the University of Puerto Rico

The sites range from 10 to 180 meters above sea level and mean annual rainfall ranges from 700 to 1300 mm. Nine replications with one seedling of each mahogany type a replication were planted at each site. The results ten years after planting are summarized here. Interim reports have already been published (3, 5). After ten years only three sites (Table 1) were adequately stocked to permit statistical analyses. Heights and breast height diameters (DBH) of the trees on these sites were analyzed by multiple regression, while survival was analyzed by chi-square.

Table 1.--Description of the three research sites with adequate stocking for statistical analyses.

Characteristic	Site		
	New Works	Betzys Jewel	Bodkin
Ecological Life Zone (4)	Subtropical dry	Subtropical dry	Subtropical moist
Soil series ^{1/}	Aguilita gravelly clay loam	Eroded Descalabrado gravelly clay	Victory clay loam
Soil classification ^{2/}	Typic Calciustoll	Lithic Ustropept	Typic Ustropept
Approximate rainfall	825 mm	1100 mm	1300 mm

^{1/} Soil series descriptions are available from the USDA Soil Conservation Service, Fort Worth, Texas.

^{2/} By the 7th Approximation of a Comprehensive System of Soil Classification of the International Society of Soil Science.

RESULTS AND DISCUSSION

Three sites were soon eliminated from the trial because of heavy losses, mostly due to drought. Later, losses to drought reduced stocking in four more sites to levels unsuitable for statistical analysis. Survival in these was hybrid, 33%); Honduras mahogany, 19%; West Indies mahogany, 33%. A fifth site was abandoned after 5.1 years to another use. Results on this fifth site were:

<u>Mahogany species</u>	<u>Survival</u>	<u>Height</u>
Hybrid	72%	3.8 m
Honduras	22%	1.2 m
West Indies	56%	2.1 m

In the three remaining sites, 10.3 years after planting, the two maternal groups of hybrid mahoganies, which were approximately equal in height and DBH, were larger than the parent species and with a single exception, significantly so (Table 2). More hybrid trees survived than other species although the differences were not quite statistically significant at the 5% confidence level.

Table 2.--Average survival and growth of mahoganies at Estates New Works, Betzys Jewel, and Bodkin, 10.3 years after planting.

<u>Mahogany species</u>	<u>Height (m)</u>	<u>DBH (cm)</u>	<u>Survival (%)</u>
Hybrid (H) ^{1/}	7.2ab ^{2/}	12 b	74a
Hybrid (WI) ^{1/}	7.7 b	13 b	78a
Honduras	6.4a	8a	48a
West Indies	5.2	7a	56a

^{1/} (H) Honduras mother; (WI) West Indies mother.

^{2/} Averages are significantly different at the 5% confidence level, if not followed by any letters in common.

These results support the hypothesis derived from experience that the hybrid is more drought tolerant than Honduras mahogany and grows faster than West Indies mahogany. But in addition, the hybrid was better in both criteria than either species. Its adaptability can be seen from the following: survival and height at New Works was 83% and 6.1 meters; at Betzys Jewel 72% and 9.4 meters; at Bodkin 72% and 6.8 meters; so that even at its worst it was as good as, or better than, the average of the other species.

However, drought is a problem in establishing hybrid mahogany. Exposure to the prevailing wind and variability of month to month rainfall (1) are causes of drought mortality. The rainfall variability, besides making prediction of a good planting month hazardous, causes lush growth in periods of heavy rainfall, and this growth sometimes is killed back before it can harden by periods of very dry weather. Hybrid mahogany is more susceptible to the top killing than West Indies mahogany, but over the long run more timber will be obtained with the hybrid. Therefore, we recommend planting the hybrid (Figure 2) in the Virgin Islands except on very dry sites such as the east end of St. Croix.

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Figure 2. — Fifteen-year-old plantation of hybrid mahogany at Estate Bodkin, St. Croix, U.S. Virgin Islands.

LITERATURE CITED

- (1) Bowden, M. J.
1968. Water balance of a dry island. The hydroclimatology of St. Croix, Virgin Islands and potential for agricultural and urban growth. Geography Publications at Dartmouth (Hanover, New Hampshire), No. 6. 89 p.
- (2) Briscoe, C. B. and Lamb, F. B.
1962. Leaf size in *Swietenia*. Caribbean Forester 23:112-115.
- (3) Briscoe, C. B. and Nobles, R. W.
1962. Height growth of mahogany seedlings. USDA Forest Service, Tropical Forest Note 13. 2 p.
- (4) Holdridge, L. R.
1967. Life zone ecology. Tropical Science Center, San José, Costa Rica. 206 p.
- (5) Nobles, R. W. and Briscoe, C. B.
1966. Height growth of mahogany seedlings, St. Croix, Virgin Islands. USDA Forest Service, Research Note ITF 10. 4 p.

