

Leaf Size in Swietenia

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S U M M A R Y

A study was made of the putative hybrid of bigleaf and small-leaf mahoganies. Initial measurements indicated that bigleaf mahogany can be distinguished from small-leaf mahogany by gross measurements of leaflets.

Isolated mother trees yield typical progeny.

Typical mother trees in mixed stands yield like progeny plus, usually, medium-leaf progeny.

Mediumleaf mother trees yield mixed progeny and usually yield all three types: bigleaf, small-leaf, and mediumleaf.

Although there must remain an element of doubt until hand pollination under controlled conditions is accomplished, it seems apparent that the medium-leaf mahoganies previously reported as hybrid between *Swietenia macrophylla* and *S. mahagoni* actually are hybrid.

For the trees observed bigleaf, small-leaf, and Pacific mahoganies can be separated on the basis of leaf venation.

R E S U M E N

Se hizo un estudio del tipo supuestamente híbrido entre la caoba de hoja grande y la caoba de hoja pequeña. Las mediciones iniciales indicaron que la caoba de hoja grande puede distinguirse de la caoba de hoja pequeña haciendo mediciones de las hojuelas.

Arboles madres aislados producen progenie típica.

Arboles madres típicos en rodales mixtos producen progenie semejante; por lo general también producen progenie de hojas medianas.

Arboles madres de hoja mediana producen progenie mixta y generalmente progenie de los tres tipos: de hoja grande, hoja pequeña y hoja mediana.

Aunque existirá alguna duda hasta que se efectúe la polinización artificial bajo condiciones controladas, aparentemente la caoba de hoja mediana antes considerada como el híbrido entre la *Swietenia macrophylla* y la *S. mahagoni*, es en sí híbrida.

Según los árboles observados, la caoba de hoja grande, la caoba de hoja pequeña y la caoba del Pacífico pueden distinguirse basándose en la venación de las hojas.

For several years there have been reports (Stehlé 1946, Tropical Forest Research Center 1960, others)^{2/} of a putative hybrid between small-leaf mahogany (*Swietenia mahagoni* Jacq.) and bigleaf mahogany (*Swietenia macrophylla* King), based chiefly on leaf size. An attempt was made to determine whether the assumed differences actually exist.

LEAF SIZE

The first step was to collect a number of

leaves from "typical" trees of each species for measurement and observation. One leaf was taken from the crown, two-thirds of the way up, of each of three trees of each species. From this leaf, the three central leaflets on the right-hand side of the rachis were taken for measurement. In addition to the two better known species, Pacific mahogany (*S. humilis* Zucc.) was also measured. Results are shown in Table 1.

It was gratifying to find the leaflets of bigleaf mahogany so consistently longer and wider than the leaflets of small-leaf. In subsequent measurements sizes were found which

^{1/} Dr. Lamb is now with U. S. Plywood Corporation.

^{2/} Stehlé, H. 1946. Les types forestiers des îles caraïbes. Carib. For. 7 (Supp. 2) 337-709.

Tropical Forest Research Center. 1960. 1959 Annual Report. Carib. For. 21:1&2:1-11.

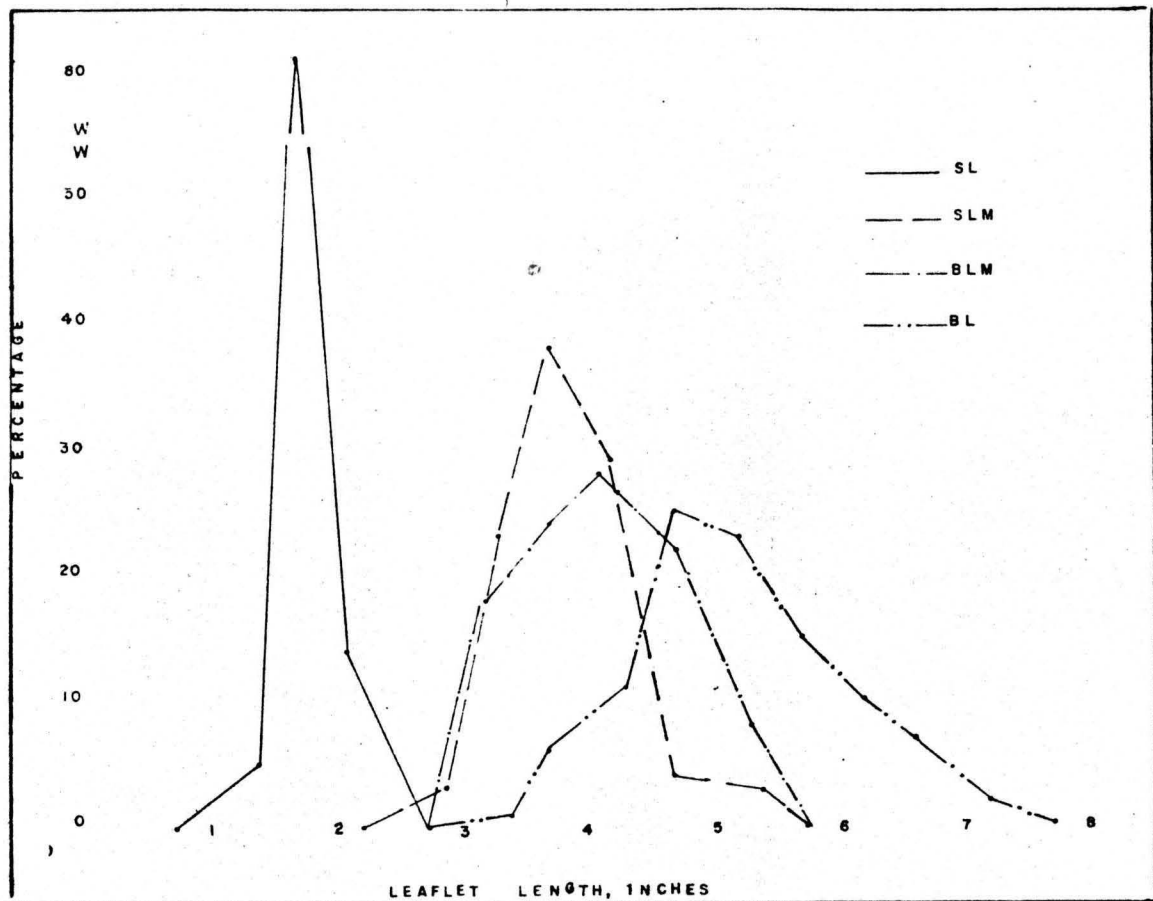


Figure 1. Percentage distribution of length of mahogany seedling leaflets; one leaflet measured per seedling. SL: Small-leaf progeny from isolated mother; SLM: Mediumleaf progeny from small-leaf mother; BLM: Mediumleaf progeny from bigleaf mother; BL: Bigleaf progeny from isolated mother. Measurements provided by R.W. Nobles. BLM based on 50 measurements, remainder on 100 measurement each.

do overlap, but mean leaflet length or width serves to distinguish objectively between the two species.

Unfortunately for tidiness, Pacific mahogany overlaps both the other species in all dimensions measured.

During this intensive comparison three other leaf characteristics were noted as distinguishing: prominence of lateral veins, prominence of edge veins, (veins forming a more or less continuous system near and essentially parallel to the leaf margin), and the shape of leaflet tip.

Small-leaf mahogany leaflets had no prominent veins and an acute tip. This last characteristic is indicated quantitatively by a relatively low ratio of maximum width to width one centimeter from the tip.

Bigleaf mahogany had prominent lateral and prominent edge veins, and had an acuminate tip. This last is shown by the high ratio of maximum width to tip width.

Pacific mahogany had a variable tip; however, it had prominent lateral veins—unlike small-leaf—and inconspicuous edge veins—unlike bigleaf.

Table 1. Measurement of leaves from "typical" mahogany trees

Prominent veins		Rachis length	Leaflet			Max. Width Tip width
Lateral	Edge		Length	Width		
				Maximum	1 cent. from tip	
		mm	mm	mm	mm	
Small-leaf						
No	No	52	59	19	4	4.8
			40	14	7	2.0
			33	12	8	1.5
No	No	72	51	15	4	3.8
			47	14	6	2.3
			39	13	8	1.6
No	No	47	44	14	8	1.8
			41	12	6	2.0
			34	12	8	1.5
		Mean	43	14	7	2.4
Bigleaf						
Yes	Yes	175	137	39	4	9.8
			131	47	3	15.7
			103	39	4	9.8
Yes	Yes	77	120	55	3	18.3
			85	33	4	8.2
			81	32	4	8.0
Yes	Yes	110	93	41	6	6.8
			92	33	5	6.6
			90	31	5	6.2
		Mean	104	39	4	9.9
Pacific						
Yes	No	92	132	66	5	13.2
			96	40	4	10.0
			92	38	5	7.6
Yes	No	120	87	30	10	3.0
			73	36	10	3.6
			70	27	12	2.2
Yes	No	60	56	23	3	7.7
			50	17	5	3.4
			29	11	5	2.2
		Mean	76	32	7	5.9

In addition, Pacific mahogany had a more leathery, coarser-seeming leaflet than either of the other two.

PROGENY TEST

Once guide lines were established for objectively distinguishing between the two major species, seeds were collected from five types of mother trees and sowed in randomly selected portions of a single seed bed. Results are shown in Table 2.

Again, the initial results were so gratifyingly clear that further counts were unnecessary, although inspection of subsequent

seedlots has confirmed them.

Seedlings grown from seed collected from isolated small-leaf mother trees yielded only small-leaf progeny. Isolated bigleaf mother trees yielded only bigleaf progeny. Small-leaf mother trees in mixed stands yielded small-leaf and mediumleaf progeny. Bigleaf mother trees in mixed stands yielded bigleaf and mediumleaf progeny. And mediumleaf mother trees yielded bigleaf, small-leaf, and mediumleaf progeny.

There are no trees of Pacific mahogany of seed-bearing size in Puerto Rico; therefore, no investigation was possible at this time.

Table 2. Number of progeny by leaf type, for each mother tree

Type	Mother-tree	No.	Progeny Type			
			Bigleaf	Small-leaf	Mediumleaf	Mixed
Bigleaf, isolated		1	46			
		2	28			
Bigleaf, near small-leaf		3			76	
		4	33			
		5				27
Small-leaf, isolated		6				41
		7		100		
		8		38		
		9		96		
		10		35		
		11		60		
Small-leaf, near bigleaf		12		31		
		13		38		
		14		29		
		15	23	7	6	
		16				45
Mediumleaf		17	17	11	47	
		18				22
		19				30
		20	9	19	16	
		21				55
	22 ^{1/2}		39	236	3915	
	23 ^{1/2}		1021	9	20	

1/ Data provided by Division of Virgin Islands Forestry Assistance.