
YACAL, OUR MOST ABUNDANT STRONG-CONSTRUCTION TIMBER.

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Yacal is produced by several different trees of the greatest timber-producing family in the Philippines. It is the hardest, heaviest, strongest, and most durable timber of its family (with the possible exception of the dense yellow heartwood of *narig*), and is at the same time the most abundant of all Philippine woods possessing this combination of good qualities. Beside these advantages, it is also the cheapest of our strong and durable construction timbers.

Yacal (using this as the trade name of all the species that produce wood of this grade) is hard, heavy, strong, tough, and very durable. When freshly sawn it is of a dull yellow color, rapidly turning to brown which, on long exposure to the weather, becomes a brownish gray. Sound dry wood from mature trees, when finished with a sharp tool, has a somewhat translucent appearance, like yellowish horn. The wood is rather coarse in texture, somewhat cross-grained, therefore not difficult to split tangentially, but very difficult to split radially. It is not difficult to saw, especially when fresh, the sawing leaving no "furry" surface. When old and dry, it saws, if possible, with an even cleaner surface than when fresh. Nor is it difficult to plane, except that, on account of its cross-grained structure, the plane has to be set very fine for the finishing cut.

Yacal is one of the best all-round structural timbers in the Islands. It can be obtained in almost any length or size desired, and in price it is much lower than ipil and molave, its chief competitors for large construction timbers. The following table shows the prices and the mechanical properties of yacal and a number of other well-known timbers; the prices are quoted from the Bureau of Supply, which, as is well known, is one of the largest timber purchasers and purveyors in the Islands at present; the figures showing weight, stiffness, and strength are from Gardner's "Mechanical Tests, Properties, and Uses of Thirty-four Philippine Woods." (Bull. 4; also Bull. 11). In each case where several figures are given by Gardner for timber from dif-

ferent sources, or of different degrees of seasoning, the highest figure is quoted.

Name of timber.	Price per 1,000 board feet.	Weight per cubic foot of dry wood.	Stiffness (modulus of elasticity, 1,000 pounds per square inch).	Strength (modulus of rupture, pounds per square inch).
	<i>Pounds.</i>			
Molave	₱250	49	1,614	8,580
Ipil	₱192-250	50	1,953	13,520
Yacal	130	52	2,583	15,690
Mangachapuy	125	37	1,528	8,600
Palo Maria	120	39	1,461	8,930
Guijo	107	44	2,158	15,150
Lumbayao	76	35	1,570	11,390
Apitong	71	40	2,144	11,620

* Approximate.

A cursory examination of this table shows the superiority of yacal in strength and also that it has the advantage in price over the only two of the whole list that equal it in durability namely, molave and ipil. For all structural purposes, except salt-water piling, yacal is only slightly less durable than those two, even when in contact with the ground. Railway ties of yacal have been known to last ten years, and termites do not destroy it easily, but the teredo attacks it rapidly when used for piling.

Yacal is used and recommended for the following purposes: Posts; poles, paving blocks; ties; bridges and wharfs (above tide water); beams, joists, rafters; window sills; sash; siding; flooring; keels and other heavy framing in ships; ax and other tool handles; spokes, fellies, hubs, poles, singletrees, axles, cart frames; steering wheels; plows and harrows; skids, levers, etc.; fence posts, rails, pickets, etc.

On account of its great strength and durability, cheapness and abundance, yacal is especially valuable for heavy construction as a substitute for molave, ipil, dungon, betis, bansalaguin, and similar strong and durable, but comparatively scarce and high-priced, woods. As seen from the above table, it costs from ₱60 to ₱120 less per 1,000 feet than molave and ipil; whereas it weighs but very little more, it is nearly 14 per cent stronger than ipil and over 45 per cent stronger than molave. On the other hand, it is much more durable than, for instance, guijo and apitong; both of these are more abundant than yacal, are considerably cheaper and approach it in strength, but neither one of them can be compared to it in durability under severe conditions.

In situations exposed to rain, such as window sills, frames

and sash, porch pillars, balustrades, and floors, yacal has another advantage over molave and ipil. Both of these stain the water that runs over them, molave to a dirty yellow and ipil to a dark, rusty brown. In the case of molave, the stain is not so penetrating nor does it continue to come out for more than the first rainy season, but the coloring matter of ipil continues to come out for years, badly discolored any adjacent masonry, cement, or other



Base of yacal, showing characteristic bark.

woods, whether painted or unpainted. Yacal is practically free from such soluble coloring matter and consequently does not disfigure neighboring parts of the building.

Such comparisons might be made with almost all the woods known in the Islands and in almost every case yacal would be found to excel any given competitor in two out of the three great requisites—cheapness, strength, durability.

Yacal is very widely distributed, one or more of the species producing commercial yacal being found in most provinces.

True yacal (*Hopea plagata*) has been reported from the following provinces, the words in parenthesis being the local names of the species in each given region: Cagayan (*taggay*), Ilocos Norte (*seggay*), Nueva Vizcaya (*banutan*), Pangasinan (*yacal*), Bulacan (*saplungan*), Zambales (*yacal*, *siggay a purao*), Min-



Bole of a tall yacal tree.

doro (*malium*), Tayabas (*yacal*), Camarines and Sorsogon (*guisoc-guisoc*), Zamboanga and Basilan (*quiebra-hacha*), Cotabato (*yacal-negro*).

Black yacal is a variety of the same species found in Zamboanga, Pangasinan, and Zambales. In Zamboanga, especially, it is generally of smaller diameter than the typical form; for this reason the minimum diameter limit for cutting it was reduced to 40 centimeters in those regions where it is common. The local

name yacal-negro given it in Zamboanga is derived from the dark color of the bark, the wood being identical with yacal. Beside the Zamboanga name of yacal-negro, it is known by the same local names as yacal.

Other species producing commercial yacal are:

Guisoc (*Shorea balangeran*), reported from Pangasinan (pamayausen, yamban), Zambales (yamban puti), Tayabas (yacal), Camarines and Albay (guisoc, guisoc-guisoc, guisoc amarillo, guisoc kalabañgan), Leyte (guisoc madlao), Zamboanga (guisoc, yacal), Davao (guisoc); Malayacal (*Hopea ovalifolia*) and magasusu (*Hopea mindanensis*) from Zamboanga and Basilan.

Another species (*Hopea foxworthyi*) is known both in Zamboanga and Sibuyan as mangachapuy, but the wood is hard and heavy and would certainly pass in the market, not as a mangachapuy, but as a yacal.

One of the most recently discovered species (*Hopea* sp. undescribed) is reported so far only from Tawi-tawi, where it is known as gyam.

Narig (*Vatica mangachapoi*), the yacal-like wood mentioned above (with some other, so far undescribed kinds of the same genus), is reported from a large number of provinces: Cagayan (banik, narik), Ilocos Sur (labang, kalanigin), Benguet (aniga), Union (salungan), Pangasinan (tiranlay, aningat, putungan), Nueva Ecija (palosapis), Tayabas (yacal blanco, bibit), Rizal (lasikan), Laguna (palosapis), Bataan (karig), Camarines (dagam), Albay (tapurao), Leyte (saung-saungan), Davao, Cotabato (narig), Zamboanga and Basilan (narig), Misamis (banga-susu). It has a large and rather perishable sapwood, easily attacked both by fungi and insects, but the heartwood is probably as durable as the best of the yacals. It is of very fine texture, straight grained, hard, and heavy, but not difficult to work, taking a smooth and glossy finish under a sharp tool; it is pale yellow when fresh, turning to clear yellowish brown on exposure. The trees are tall, straight, and rather slender, of excellent form for posts, piling, and sawn or hewn railroad ties.

"It is the imperative duty of the state to create school organizations which deal with the trade-training of boys and girls, which enter into the question with the utmost thoroughness, enlarging and deepening it, and thereby awakening in boys and girls many-sided capacity for work and a living joy in work." (Dr. Georg Kerschensteiner.)