Ceiba pentandra (L.) Gaertn.

C.R. ALVARADO, C.A. ALVARADO, and O.O. MENDOZA
Jefe Programa Nacional de Viveros Forestales, Administración, Forestal del Estado, Tegucigalpa, Honduras;
Jefe Departamento de Investigación Forestal, Escuela Nacional de Ciencias Forestales, Siguatepeque, Honduras; and
Gerenta General Semillas Tropicales, Siguatepeque, Honduras

BOMBACACEAE (BOMBAX FAMILY)

Bombax pentandrum Linn.

Bongo, ceiba, ceibo, fromager, kapok, pochote, silk cotton-tree

Ceiba pentandra is amply distributed in the intertropical regions of the world; its habitat is wet forests, especially secondary forests (Standley 1931). In America it grows naturally from Mexico, through Central America, to Colombia, Venezuela, and Ecuador; in the West Indies, from Cuba and Jamaica to Trinidad and Tobago (Jiménez 1997). In Honduras, it is found in the departments of Francisco Morazán, Comayagua, Yoro, Cortes, Colon, Atlantida, and Olancho.

Ceiba pentandra is a gigantic, fast-growing tree, of up to 50 m in height. It has a straight, cylindrical shaft, with commercial lengths of 20 m and diameters of up to 2 m (Benitez and Montesinos 1988, Salas 1993). Young trees have notably verticillate branches, with large conical thorns on the trunk (Standley 1931). The bark is yellowish, granulated, and smooth on the outside and pale-pinkish gray and fibrous near the alburnum. The bark turns orange and then brown and is often covered with large conical thorns. It is up to 5 cm thick. The leaves are digitate-compound and grouped alternately at the end of the sprigs (Standley 1931). In Honduras, it grows at elevations up to 1000 m, especially in wet areas. In dry regions, it is found near permanent waters.

In dry condition, the wood ranges from light brown to pale yellow, with rosy-brown streaks. It is light, with no characteristic odor or taste; it has intercrossed, and occasionally a straight hilum, thick texture, medium shine, and marked streak. There is no pronounced difference between the alburnum and the duramen. Silica content is 0.33 percent. Specific gravity is 0.24. Total radial shrinkage is 2.5 percent, intermediate 1.3 percent; total tangential shrinkage is 3.9 percent, intermediate 2.2 percent; and tangential:radial shrinkage ratio is 1.60. Total volumetric shrinkage is 6.9 percent (Benitez and Montesinos 1988). The wood is easy to saw and satisfactory to moderately difficult to plane. It accepts paint very well. It does not turn, drill, chisel, or mold well. It resists cracking caused by screws; it shows a floccose grain and regular sanding. The wood has an extremely low resistance to fungi and is susceptible to attacks by dry wood termites. It dries at a moderate speed with moderate defects. It is easy to preserve (Benitez and Montesinos 1988). The wood is used in light construction, canoes, rafts, floats, lifeboats, fillers for plywood, veneer, airplanes, model airplanes, aquaplanes, all types of thermal insulant, interior finishes, handicrafts, boxes and crates, toys, briquettes, pulp, and paper. The oil from the seed is used for lighting and in the manufacturing of soaps; the cotton from the seed is used to manufacture buoys, lifeboats, pillows, and similar articles (Aguilar 1966).

The big, whitish, hermaphroditic flowers are 2 to 5 cm long and are arranged in pendulous fascicles hanging at the end of the sprigs. The tree blooms December through January. The fruit is an ovoid, ligneous, greenish capsule, up to 14 cm long, with numerous black seeds hidden in a mass of gray silky hairs (cotton); it opens up in five valves. The tree fructifies March through April. The black seeds are round, smooth, and intermediate/recalcitrant. Seeds average 14,000 to 26,000 per kg.

Seeds cannot be stored for a long period of time (Semillas Tropicales 1998). Stored in glass or plastic containers at 4 °C with 60 percent relative humidity and 15 to 20 percent physical moisture, seeds can be preserved up to 1 year. When they are ripe and fresh, seeds have 90 to 100 percent viability. Seeds are pretreated by soaking in water for 24 hours and cutting longitudinally without damaging the embryo. Germination is good, using a substrate of sand under conditions of 20 to 30 ^{o}C alternating temperature, with 8 hours of light daily (Standley 1931).

ADDITIONAL INFORMATION

The petiole is 5 to 25 cm long, partially reddish toward the base and caniculate, thin, glabrous, and pulvinated on both ends with five to nine sessile leaflets. The lamina is lanceolate to oblanceolate, 5 to 20 cm in size, with an acuminate apex. The base is cuneiform or attenuate with whole edges; the right side is dark green and the back is pale green. Both surfaces are glabrous. The main vein is prominent on both sides and partially reddish below with 10 to 20 pairs of secondary veins that are slightly prominent on both sides; slightly acrodrome anastomosed near the edge, yellowish green, bending toward the edges, camptodrome.

Mechanical properties:

Static flexure (in green condition and at 12 percent moisture): stress at proportional limit 123 and 173 kg per cm^2, maximum stress 181 and 280 kg per cm^2, modulus of elasticity 27 x 10(3) kg per cm^2, work at proportional limit (12 percent) 0.4 kg-m per cm^3, work at maximum load (12 percent) 1.5 kg-m per cm^3.

Parallel compression (in green and dry condition, respectively): stress at proportional limit 55 and 190 kg per cm^2, maximum stress in green condition 75 kg per cm^2, modulus of elasticity in green condition 32.4 x 10(3) kg per cm^2.

Specific compression (in green and dry condition, respectively): stress at proportional limit 7 and 22 kg per cm^2.

Janka hardness (in green and dry condition, respectively): tips 101 and 186 kg; lateral 74 and 108 kg.

Shear or cutting (green and dry, respectively): maximum stress 25 and 35 kg per cm^2.

Cleavage (in green condition): maximum stress 7.75 kg per cm^2 (Benitez and Montesinos 1988).

1cm
1cm
1cm