Hyeronima alchorneoides Allemão

E.M. FLORES
Academia Nacional de Ciencias de Costa Rica, Costa Rica

EUPHORBIACEAE (SPURGE FAMILY)

Stilaginella laxiflora Tul. (Annales des Sciences Naturelles, Botanique service 3, 15: 244; 1851); *Stilaginella amazonica* Tul. (Annales des Sciences Naturelles, Botanique service 3, 15: 244; 1851); *Stilaginella ferruginea* Tul. (Annales des Sciences Naturelles, Botanique service 3, 15: 244; 1851); *Hyeronima ferruginea* (Tul.) Tul. (Flora Brasiliensis 4 [1]: 334; 1861); *Hyeronima laxiflora* (Tul.) Müll-Arg. (Linnaea 34: 66; 1865); *Hyeronima mollis* Müll-Arg. (Prodromus Systematis Naturalis Regni Vegetabilis 15 [2]: 269; 1866); *Hyeronima caribaea* Urban (Repertorium Specierum Novarum Regni Vegetabilis 16: 139, 1919); *Hyeronima mattogrossensis* Pax & Hoff. (Planzenreich 81: 39; 1922); *Hyeronima heterotrichia* Pax & Hoff. (Planzenreich 81: 39; 1922); *Hyeronima chocoensis* Cuatrec. (Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales 7 [25-26]: 52; 1946); *Hyeronima tectissima* L. A. Standl. & L. O. Williams (The Rain Forests of Golfo Dulce 222, t. 29; 1956); *Hyeronima alchorneoides* var. *stipulosa* P. Franco (Botanische Jahrbücher für Systematik, Planzengeschichte und Planzengeographie 111 [3]: 321-323, f. 10; 1990); *Hyeronima ovatifolia* Lundell (Wrightia 4 [4]: 134; 1970)

Aguacatillo, ajo-ajo, ajono, ajowo, amapaia, anoniwana, apamate, aricurqua, bois d' amande, bois de vin, bois divin, bully tree, cachete toro, cajuela, calun calun, cartan, cartancillo, catatú, cedro macho, chac-te-cook, colorado, coral, curtidor, dalina, dionkoimata, florecillo morado, horseflesh mahogany, itahuba blanca, itahuba colorada, katoelienja, licurana, makoeroerian, malangazote, mapique, mará-gonçalo, margonçalo, mascarey, minua, muiracongalo, nance, nancito, nancitón, okotjo, orocurana, palo chanco, palo curtidor, palo rosa, pantana, piento-bolletrie, pilón, plátano, quina, quindú canela, rosa, sagua, scotch ebo, serdani, soeladan, soeradan, sorodon, suradán, suradanni, surdina, tapana, tapanare, tapierín, tarroema, teloko-enoeroe, tinto morado, tokadie-ballie, torito, troko-enoeroe, trompillo, urucurana, urucurana de leite, urucurana miri, waikwabia, win oudou, zapatero (Flores 1993, Franco 1990, Longwood 1971)

Hyeronima alchorneoides is an important taxon of the neotropical forest, whose center of distribution is located in the Andes (South America). It is found from Belize to the Amazon region and in the West Indies (Brako and Zarucchi 1993, Burger and Huft 1995, Jorgensen and León-Yáñez 1999, Jorgensen and Ulloa 1994, Macbride 1951, Molina 1975, Renner and others 1990). *Hyeronima alchorneoides* is a canopy tree, abundant in humid and very humid tropical forests.

Hyeronima alchorneoides is a tall, evergreen tree, with a straight bole and spreading, extended buttresses on the lower third. It is a tree that may reach up to 50 m in height and 100 to 120 cm d.b.h. The crown is wide and extended. The branches are subterete and angulous. The bark is fissured, hard, brittle, and light brown or reddish brown; it is 0.75 to 0.80 cm thick. Internally, it is pink or red and contains a large amount of tannins. It has a bitter taste (Burger and Huft 1995, Flores 1993, Longwood 1971, Macbride 1951). The leaves are alternate, entire, petiolate (petioles adaxially caniculate, with lepidote indumentum), and stipulate. The leaf blade is wide ovate, wide elliptical, or obovate; the leaf apex is round, obtuse, or acuminate; and the leaf base is attenuate, round, cordate, obtuse, or cuneate. *Hyeronima alchorneoides* grows well in very humid plains that are seasonally flooded during the rainy season. The species grows in soils that are alluvial or clayey and acid. It grows where the annual rainfall is 3500 to 5000 mm and temperatures are 24 to 30 °C. The elevational range of this species is 20 to 900 m (Flores 1993, Franco 1990, Woodson and Schery 1967).

In green wood, the sapwood is reddish brown or pink while the heartwood is dark red, reddish brown, or deep brown, being similar to black walnut (*Juglans nigra*) in appearance (Flores 1993, Longwood 1971). The growth rings are outlined by dark terminal bands formed by thick-walled fibers. It has straight or interlocked grain depending on the site of species origin; wood with interlocked grain has a striped or ribbon-like appearance. Texture is moderately coarse and has low luster; the dry wood is odorless and tasteless. The wood is strong and heavy (green weight 1100 to 1150 kg per m^3; with 85 to 90 percent moisture content; basic specific gravity is 0.60 to 0.65), which is comparable to pignut hickory (*Carya ovata* [Mill.] K. Koch) and white oak (*Quercus alba* L.) (Llach 1971, Longwood 1971, Van der Slooten and others 1971). The wood has moderately high shrinkage compared with woods of similar density and is comparable to white oak in directional and volumetric shrinkage (5.1 to 5.3 percent radially, 9.2 to 94 percent tangentially, 13.3 to 14.5 volumetrically from green to oven-dry). Strength properties are normal in green and air-dry conditions except for deficiencies in work-to-maximum-load (shock resistance), compression and tension across the grain (crushing strength and hardness), and cleavage (splitting). It bends moderately well except in shock resistance, comparable to sweet birch (*Betula lenta* L.) (Longwood 1971). Wood air-drying is fast and easy; however, 38 to 40 percent of wood pieces develop twisting, and 30 percent of them collapse. It has excellent sanding, boring, and mortising properties; very good turning properties; good shaping properties; and poor planing properties. With the exception of planing, wood machining is above the average for 25 domestic hardwoods in the United States (Davis 1949, Longwood 1971). The wood is moderately difficult to work because of its poor planing properties; shallow chipped grain during planing is frequent, and the wood must be scraped well to achieve a smooth finish (Longwood 1971). During brushing, 30 percent of pieces develop a fibrillar appearance and rough grain; 40 percent develop a smooth and flawless surface (Llach 1971). The wood is durable and resistant to termites and white- and brown-rot fungi at ground level but is susceptible to wood-decomposing fungi attacks at underground levels (Llach 1971, Longwood 1971, Wangaard and others 1955). The wood can be used in marine pilings, general heavy construction (interior and exterior), furniture, cabinetwork, decorative veneer, framework, rafters, sheathing in building construction, boat construction, structures for bridges and fences, stakes, barrel construction, and railway ties (Llach 1971, Longwood 1971). The Peteri's coefficient of flexibility is 65, and the Runkel factor is 0.91 [group III: good for making paper (Llach 1971)].

The species is dioecious, and the flowers, unisexual. The tree blooms twice a year, and the primary period of flowering occurs from May to July, with a peak in June. The flowering can vary with rain patterns and range of geographical distribution. Sometimes the species blooms in November, December, or January. The flowers, grouped in axillary panicles of a variable size and number of lateral branches, are inconspicuous and yellowish green. Cross-pollination is obligatory; the floral anthesis takes place in the early morning and many small insects contribute to pollinating the pistillate flowers. Fruits are produced from January to March, sometimes in April. The fruit is drupaceous and turns red or dark purple at maturity. The surface is bright and almost glabrous. The exocarp is thin and membranaceous; the mesocarp is fleshy, soft, and sweet. The endocarp is hard and sclerenchymatous and surrounds the only seed developed in the fruit (Flores 1993). The ripe fruits fall by gravity, alone or in clusters. Birds and monkeys are the main commensals and dispersers. It is possible that seed passage through the bird or monkey digestive system promotes seed germination through endocarp scarification. Seeds are small.

Seeds average 26,400 to 26,500 (seed + endocarp) per kg, with 67 percent moisture content (fresh weight). The percentage of germination is 60 to 70 percent, but varies strongly depending on seed origin. Seeds are viable for 10 to 15 days if moisture and temperature are adequate.

Seed behavior seems recalcitrant and information on seed storage is nonexistent. The species germinates and grows in clearings and well-illuminated places. Seedlings and saplings are not common in the forest understory. Red ants (*Atta cephalotes*), the larvae of *Hylesia alinda*, and other herbivores—deer, mountain goats, and rabbits—attack them. Germination is epigeal and seedlings are phanerocotylar. Under greenhouse conditions, germination occurs at 25 to 30 days; it is gradual. Initially the cotyledons are enclosed in the seedcoat (60 percent of seedlings) but the latter is removed at 45 to 50 days (Arias 1992, Flores 1993).

The species grows well in plantations and has been planted in monospecific plantations with a planting distance of 3 by 3 m. Holes must be 15 cm deep and seedlings must be transplanted in adobe (keeping the surrounding substrate). Plantations must be cleared three to four times during the first year. Seedling mortality in plantations is low, and the species has an efficient autopruning system; however, branches must be trimmed at 9 to 12 months later (Arias 1992, Flores 1993, González 1991). In the Sarapiquí zone (Costa Rica), the annual increase in height is 1.6 m during the first 3 years; diameter increases 2.2 cm annually. About 80 percent of trees have a straight and vigorous bole (Arias 1992, González 1991).

The species is not susceptible to pests and diseases, but several animals predate young seedlings and saplings. Shoot apex damage induces stem bifurcation (Flores 1993).

ADDITIONAL INFORMATION

Hyeronima alchorneoides is the type species of the genus. It was named *Hyeronima* as homage to Jeronimo Serpa, a Brazilian botanist (Flores 1993, Franco 1990).

The leaf's adaxial surface has scarce pubescence (multicellular hairs); the abaxial surface has a densely lepidote indumentum. Venation is pinnate brochidrodromous, with 6 to 12 secondary veins. The midrib is wide, straight, and projects toward the abaxial surface. Secondary veins are parallel and uniformly spaced with a moderate and uniform divergence angle; they branch toward the margin. Tertiary veins are percurrent, branched, and projected abaxially. The leaf is hypostomatic, and the stomata are paracytic. Stipules are variable in shape but always conspicuous, foliaceous, petiolate or sessile, quite permanent, basally wide, fleshy, and commonly inhabited by ants (Flores 1993).

The flower bracts subtending the inflorescence branches tend to be morphologically different from those of the vegetative axes; the proximal are large and foliaceous while the distal are short, triangular, and deltoid. The staminate panicles are corymboid and pedunculate with straight or curved branches. The peduncle is terete and 2 to 4 cm long. Floral bracts are trulate-cocleate. The male flowers have a tetramerous calyx, cupuliform, gamosepalous in the basal third, toothed distally, and densely lepidoted. The disc is annular and massive with a villous margin; stamens are within the disc and the androecium consists of four fertile stamens, sometimes five; anther lobes are pendulous and divergent during the anthesis, and dehiscence is poricidal. The connective is glandular. Pollen grains are tricolporate and perprolate (Flores 1993). The pistillate flower has a short peduncle and a calyx similar to that of the staminate flower, but the annular disc is smaller. The ovary is ovoid, bicarpelar, and covered by peltate scales; each locule contains two ovules; only one develops as a seed. The interlocular septum usually moves toward the cavity with the abortive ovule. The style is vestigial, and the stigma is punctiform and bifid. Ovules are anatropous, bitegmic, and crassinucellate and have an obturator (Flores 1993).

The seed funiculus is vestigial; the testa, thin; and the tegmen, sclerotic. Seed size correlates with fruit size. The seed is endospermic; the endosperm is nuclear but becomes cellular and oily later. The embryo is large in respect to seed size; it is straight, with a small radicle and thin, extended cotyledons. The seeds are rich in lipids (Flores 1993).


1cm
1cm
2cm
2cm
1cm