Guyana RED CEDAR
Cedrela odorata
Wood Properties

Colour and Appearance

C. odorata has Lustrous wood of medium density. The heartwood is pale cream in colour immediately after sawing, turning pinkish brown upon exposure; clearly demarcated from the narrow creamy yellow or pale brown sapwood (3-5 cm). The grain is usually straight, sometimes interlocked, sometimes woolly indicating the presence of tension wood, texture moderately fine to moderately coarse; the figure is attractive in flat-sawn hoards. Fresh wood has a distinct, lingering, cedar-like scent; this characteristic of the wood makes it a favourite for cigar boxes. It has a bitter, spice-like taste. Sometimes the wood has important resin marks. Growth ring boundaries are distinct, marked by differences in pore size and initial parenchyma (Brunner *etal*. 1994; Gérard *etal.*1996; Miller & Détienne, 2001; Lemmens, 2008). Heartwood is rated as moderately durable and moderately resistant to termites, but the sapwood is susceptible to staining and powder post beetles and is not durable (Orwa *etal.* 2009). Basic specific gravity is low to medium; variable, ranging from 0.25-0.50 (Miller & Détienne, 2001).


Cedrela odorata

Wood anatomy

Growth rings are usually distinct, marked by early-wood vessels and initial, marginal parenchyma. Wood is diffuse porous to weakly semi-ring porous. vessels uniformly distributed, solitary (35-90%) or in multiples of 2-3 (-8), generally oval; 2-4/mm^2; (115-)160-235 (-350) µm in tangential diameter; 305-575 µm in element length, gradually reducing in size through growth ring, average tangential and radial diameter 130-160 µm and 160-200 µm, respectively, and maximum tangential and radial diameter 200-305 µm and 290-355 µm, respectively, walls 3-6 µm thick (Chung *etal.* 1995). Perforation plates are simple; intervascular pits alternate; circular or oval; 6-8 µm in diameter; vessel-ray pitting with distinct borders, similar to intervascular pits in size and shape; non-vestured. Deposits in heartwood vessels as seen with the light microscope are frequent and red brown in colour (Miller & Détienne, 2001).

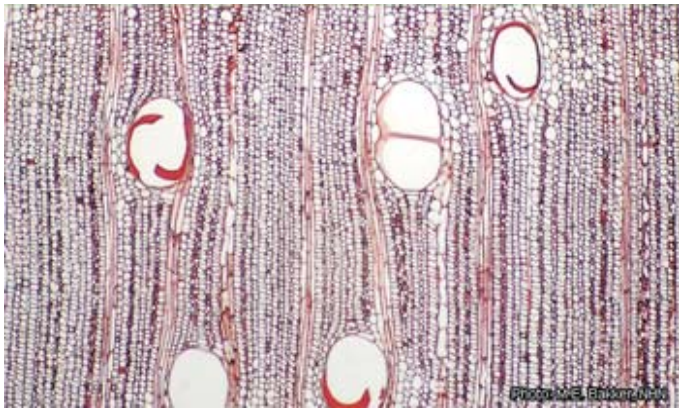

Figure 1 Wood in transverse section
Source: Lemmens (2008)

Vessels are distinct to the naked eye (Brunner *etal,* 1994). Fibres are 0.8-1.5 mm long and non-septate; tangential diameter 8-40 µm, thin-walled to thick-walled (c. 2 µm), with sparse slit-like pits mainly in the radial walls; pits simple to minutely bordered; brown deposits occasionally present (Chung et al, 1995; Miller & Détienne, 2001).

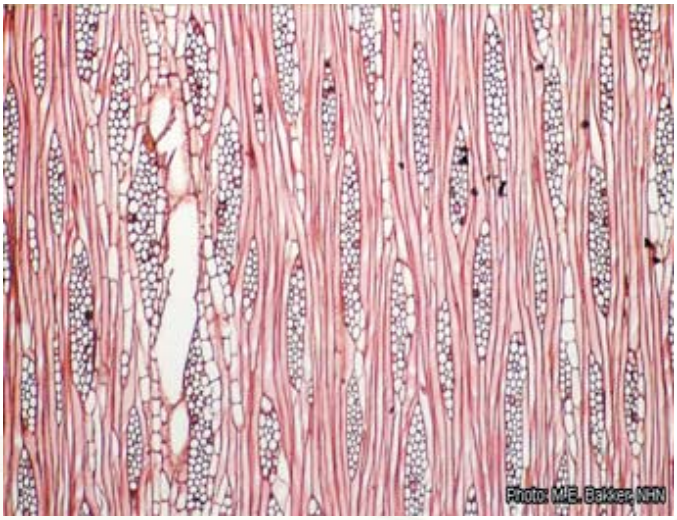

Figure 2 Wood in tangential section
Source: Lemmens (2008)

Paratracheal parenchyma are scanty to vasicentric. Marginal banded parenchyma present (bands 3-8 cells wide). Axial parenchyma mostly 3-4 cells per parenchyma strand (Miller & Détienne, 2001). Axial parenchyma are distinct to the naked eye; parenchyma bands are smaller than the fibre tissue bands (Brunner *et al.* 1994).

Rays are heterocellular, one row of upright and/or square cells (sometimes two rows); (3-) 4-5 per mm; mostly 2-3

cells wide; 255-400 µm in height. Storied structure was not observed (Miller & Détienne, 2001). The proportion of ground tissue fibres is large. Rays are usually visible without lens. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size (Brunner *etal.* 1994).

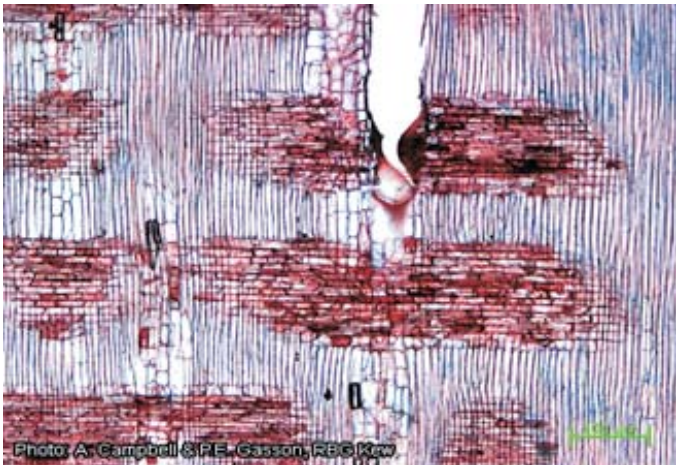

Figure 3 Wood in radial section
Source: Lemmens (2008)

Prismatic crystals are rare in procumbent cells; sometimes in upright and/or square ray cells, or in non-chambered axial parenchyma cells, or in chambered axial parenchyma (generally in short (2-4) chains); one crystal per cell or chamber (Miller & Détienne, 2001).

Horizontal intercellular canals and axial gum canals are absent (Chung *et al.* 1995).

Technological characteristics

Physical properties

The wood is light- to medium-weight, with a green density of density of 0.80 g/cm^3, while air-dry density at 12% moisture content varies according to origin from 0.35 to 0.55 g/cm^3, average 0.44 g/cm^3. Basic specific gravity is low to medium; variable, ranging from 0.25-0.50, on average 0.38. The rates of shrinkage may be low: total tangential shrinkage 6.1 %, total radial shrinkage 3.8 % and total volumetric shrinkage 10.0 %, T/R Ratio: 1.5. (Gérard *et al.* 1996).

Mechanical properties

The wood is weak. At 12% moisture content, the bending strength (modulus of rupture) is 54-67 N/mm^2, modulus of elasticity 5950-8100 N/mm^2, compression parallel (crushing strength) to grain 27.5-35 N/mm^2, compression perpendicular to grain: 3.5-4 N/mm^2, shear 6.5-8.5 N/mm^2, cleavage 49 N/mm radial and 56 N/mm tangential, Janka side hardness 1765-2050 N and Janka end hardness 2490-2740 N. (Chung *et al.* 1995; Gérard *etal.* 1996 ; Lemmens, 2008).

Processing

Workability

The wood is easy to work with both hand and machine tools. It saws, bores, turns and sands without problems and produces a good finish. However, growth stresses may cause severe end splitting of logs and warping and splitting of the central cant during saw milling (Chung *etal.* 1995). Due to its low density and softness, the wood has a tendency to woolliness, if not machined with sharp cutters; extra sanding up to finer grits may be required to obtain a smooth wood surface. Also, natural gum pockets can remain wet and may ooze out onto the surrounding surface, which can clog and gum up saw blades, and make finishing the wood a challenge. (Gérard *etal.* 1996; The Wood Database, no date).The wood is easy to glue and nails easily with good nail-holding power. Rotary peeling and slicing give good results without pre-treatment, producing attractively figured veneer, but with some tendency for woolly surfaces. (Gérard *etal.* 1996; Lemmens, 2008).

Drying

The wood dries moderately fast with a very slight risk of checking and deformation. Boards 25 mm thick take about 8 weeks to air dry and boards 50 mm thick 14 weeks. Air drying to about 30% is recommended prior to kiln drying. In general, a temperature of 65-75°C is recommended for kiln drying. U.S. kiln schedule T10-D4S is recommended for 25-38 mm stock and T8-D3S for 50 mm stock or British schedule H (25 mm) heating to 93°C (200°F) for 8 to 17 hours at a relative humidity of 60% is suggested to control oil and gum exudates in service. (Chung *etal.* 1995; Gérard *etal.* 1996).

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