

# *Leucaena leucocephala* (Lam.) de Wit

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## FABACEAE (BEAN FAMILY)

*Acacia biceps* DC., *A. caringa* Ham., *A. frondosa* Willd., *A. glauca* DC., *A. leucocephala* DC., *Leucaena blancii* Goyena, *L. glabrata* Rose, *L. glauca* (L.) Benth., *L. greggii* Watson, *L. latisiliqua* (L.) W.T. Gillis, *L. salvadorensis* Standl., *Mimosa glauca* L. (Brewbaker and others 1972, Dassanayake 1980, Hooker 1879, National Research Council 1984, Parrotta 1992b)

Acacia, acacia palida, aroma blanca, aroma boba, aroma mansa, barba de león, bois-lolo, cowbush, grains de lin pays, granadillo bobo, granadino, guaje, hediondilla, jimbay, jumbie-bean, koa haole, leadtree, leucaena, lino, lino criollo, macata, macata blanca, mimosa, monval, panelo, shack-shack, tamarindillo, tantan, tumarababu, uaxim, West Indies mimosa, white popinac, wild mimosa, wild taman, wild tamarind (Little and Wadsworth 1964, Van den Beldt and Brewbaker 1985)

The genus *Leucaena* consists of about 50 species of trees and shrubs native to tropical and subtropical regions of North and South America, Africa, and the South Pacific; 13 species are endemic to Mexico (Allen and Allen 1981, Brewbaker and others 1972). *Leucaena leucocephala*, originally from the midlands of Guatemala, Honduras, El Salvador, and southern Mexico, was spread by pre-Columbian civilizations throughout the coastal lowlands of Central America from Mexico to Nicaragua. During the Spanish colonial era it was introduced and became naturalized over a much larger area of the tropics. Today, the species is cultivated and naturalized in most countries between latitudes 25°N and 25°S (National Research Council 1984, Van den Beldt and Brewbaker 1985).

*Leucaena leucocephala*, a fast-growing deciduous species, varies in form from shrubby varieties (common or Hawaiian types) up to 5 m tall to medium-sized trees (giant or Salvadoran types) that reach 8 to 10 m in height and 50 cm d.b.h. (National Research Council 1984, Parrotta 1992b) and have spreading crowns and smooth gray to grayish-brown bark. *Leucaena leucocephala* tolerates a wide range of soil conditions, from skeletal and stony soils to heavy clays, although best growth occurs on well-drained soils with pH from 6.0 to 7.5 (National Research Council 1984, Parrotta 1992b). Although *L. leucocephala* can survive on sites receiving less than 600 mm or more than 2000 mm annual rainfall, it grows best on sites receiving about 1500 mm annual rainfall with a dry season lasting approximately 4 months. It grows well in areas with annual temperatures ranging from 20 to 30 °C with mean monthly

minimum and maximum temperatures of 16 and 32 °C, respectively (Allen and Allen 1981, Centro Agronómico Tropical de Investigación Enseñanza 1991b, MacDicken 1988, National Research Council 1984, Van den Beldt and Brewbaker 1985, Webb and others 1984). Primarily a lowland species, it does not grow well above 500 m between 10° and 25° latitudes, nor above 1000 m within 10° of the equator (Van den Beldt and Brewbaker 1985).

A high degree of genetic variability is found in the species and more than 800 varieties have been identified (Brewbaker and others 1972, Hutton and Gray 1959). Growth rates vary greatly among varieties and are strongly influenced by site conditions. Among the larger varieties on good sites, annual stem diameter and height increments generally range from 2.0 to 3.5 cm and 2.6 to 4.0 m, respectively, during the first 5 years. After 5 years, diameter growth rates tend to decline to less than 2.0 cm per year and height growth rates to 2.0 m per year (Parrotta 1992b).

*Leucaena leucocephala* is cultivated throughout the tropics in block plantations and agroforestry systems primarily for fuelwood and fodder, for soil fertility improvement, and for erosion control in degraded watersheds (National Research Council 1984, Parrotta 1992b). The species has limited value as a timber source, though it is suitable for light construction, boxes, fenceposts, particleboard, and pulp. The softwood is pale yellow and the heartwood light reddish, with a specific gravity of 0.50 to 0.59 (Hu 1986, National Research Council 1984, Parrotta 1992b, Tang 1986).

Flowering phenology varies considerably among varieties and location. The shrubby, common-type varieties flower throughout the year, often starting at 4 to 6 months of age, while the giant varieties flower seasonally, usually once or twice a year starting in the first or second year (Little and Wadsworth 1964, National Research Council 1984, Van den Beldt and Brewbaker 1985). The spherical, whitish flower heads, 2.0 to 2.5 cm in diameter across the spreading, thread-like stamens, are borne on stalks 2 to 3 cm long at the ends or sides of twigs. The abundant fruits, which mature 6 to 9 months after flowering, are flat, thin pods, 10 to 15 cm long and 1.5 to 2.0 cm wide that hold 15 to 20 seeds. The shiny, dark brown seeds are small, flat, teardrop-shaped, 8 mm long, with a thin, durable seedcoat. Seeds are released from the mature, dehiscent pods while still on the tree, although closed or partially open pods may be carried long distances by the wind.

The mature, dark brown seed pods may be collected before dehiscence using pruning poles. They should be sun-dried and then threshed to release seeds; threshing is commonly done by beating the dried pods in cloth bags (Van den Beldt and Brewbaker 1985). Seeds average 17,000 to 21,000 per kg (Centro Agronómico Tropical de Investigación y Enseñanza 1991b, Dijkman 1950, von Carlowitz 1986). Unscarified seeds stored under dry conditions will remain viable for more than 1 year at ambient temperature; at 2 to 6 °C, up to 5 years (Daguma and others 1988, Van den Beldt and Brewbaker 1985).

Although seeds may be sown without pregermination treatment, the following treatments are used to ensure more rapid and uniform germination: (a) immersion in hot water (80 °C) for 3 to 4 minutes followed by soaking in water at room temperature for up to 12 hours; (b) soaking in concentrated sulfuric acid for 15 to 30 minutes; or (c) mechanical scarification by abrading with sandpaper or clipping the seedcoat

(Daguma and others 1988, National Research Council 1984). These pregermination treatments may be followed by inoculation with nitrogen-fixing *Rhizobium* bacteria (mixed with finely ground peat) after coating the scarified seeds with a gum arabic or concentrated sugar solution. Presowing inoculation facilitates good field establishment in soils devoid of effective rhizobial strains (National Research Council 1984). Seed germination is commonly 50 to 98 percent for fresh seeds (Daguma and others 1988, von Carlowitz 1986). Scarified seeds germinate 6 to 10 days after sowing (Centro Agronómico Tropical de Investigación y Enseñanza 1991b, Dijkman 1950, von Carlowitz 1986); unscarified seeds germinate 6 to 60 days after sowing (Centro Agronómico Tropical de Investigación y Enseñanza 1991b, Dijkman 1950, von Carlowitz 1986). Germination in *L. leucocephala* is epigeal.

Seeds germinate at or near the soil surface and should not be planted deeper than 1 to 2 cm (National Research Council 1984). Nursery media should be well drained, have good water- and nutrient-holding capacity, and a pH between 5.5 and 7.5 (Van den Beldt and Brewbaker 1985). Light shade is recommended during the first few weeks of seedling development; thereafter full sunlight is recommended (Centro Agronómico Tropical de Investigación y Enseñanza 1991b, Van den Beldt and Brewbaker 1985). Taproot development is rapid in young seedlings. Seedlings generally begin to reach plantable size, 20 cm height, at 10 weeks (Van den Beldt and Brewbaker 1985, Westwood 1987). Seedlings often grow slowly during the first months after planting, and are susceptible to suppression by competing vegetation. Weeding is recommended in plantations until the seedlings overtop competing grasses or herbaceous competitors (Centro Agronómico Tropical de Investigación y Enseñanza 1991b, Van den Beldt and Brewbaker 1985)

