**Dipteryx oleifera** Benth.

**Plant Species Factsheet**

**Family:** Fabaceae

**Synonyms**:
- *Dipteryx panamensis* (Pittier) Record & Mell
- *Coumarouna oleifera* (Benth.) Taub.
- *Coumarouna panamensis* Pittier
- *Cumaruana oleifera* (Benth.) Kuntze
- *Oleiocarpus panamense* (Pittier) Dwyer

**Listed in CITES as:** *Dipteryx panamensis* (Pittier) Record & Mell

**Vernacular name:** Almendro², Eboe², Tonka bean², almendro de montaña³, almendro amarillo³, Waldmandelbaum⁴

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### Basic information on species:

*D. oleifera* is a large canopy emergent tree growing up to 40 m. The fruit is a one seeded drupe of 4 to 6 cm length and 3 cm width. Seeds are 3 to 3.5 cm long and 1.2 to 1.5 cm wide and surrounded by a brown seedcoat. Flowering period starts in July ending in February while fruiting period is from September to April (STEVENS et al. 2001). Fruits are dispersed by large frugivorous bats that take the fruits to roosting sites where they feed on the pulp and drop the seeds and by terrestrial mammals like agoutis or squirrels hoarding and burying seeds (RUIZ 2008).

The almendro tree grows in humid and very humid rainforests in the atlantic zone from Nicaragua to Colombia at elevations between 0 – 300 m (STEVENS et al. 2001). Other authors indicate its maximum elevations as 500 m (JIMÉNEZ et al. 2002 cited in SCHMIDT 2009) or 1300 m (FLORES 1992 cited in MADRIZ-VARGAS 2004). Natural habitats have a mean annual temperature of 24 °C to 30 °C and a mean annual precipitation of 3500 mm to 5500 mm (VOZZO 2002 cited in SCHMIDT 2009).

**Distribution:** *D. oleifera* is naturally distributed in Nicaragua, Costa Rica, Panama and Colombia. In Costa Rica the potential distribution area is 10,177.8 km², but the actual available area is reduced by 55.5 % (see Fig. 2). Only 3.8 % of its habitat is government protected area (ESTRADA CHAVARRÍA et al. 2005). The remaining populations concentrate in the northeast from Rio San Juan to Braulio Carrillo National Park (HANSON 2006). In Panama it occurs in the Canal Zone, Bocas del Toro, Colón, Panamá and Darién (CROAT 1978).

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¹ *The Plant List, 2013*
² www.ildis.org/LegumeWeb
³ MADRIZ-VARGAS, B. 2004
⁴ http://www.wisia.de
Ecology: *D. oleifera* is considered a keystone species due to its fruit quantity and its fruit availability during the dry season (FRANKIE et al. 1974 cited in HANSON et al. 2008). BONACCORSO et al. (1980; cited in HANSON et al. 2008) observed sixteen species of mammals and FLORES (1992; cited in HANSON et al. 2008) approximately 100 species of birds in fruiting trees. Probably the most popular bird depending on the almendro is the great green macaw (*Ara ambigua*). In the dry season fruits of *D. oleifera* make up for 80% of its diet. Additionally they prefer nesting in natural cavities of tall almendros (FRAIXEDAS et al. 2014, MADRIZ-VARGAS 2004). The great green macaw is listed as an Appendix I species by CITES since 1985 (UNEP-WCMC database) and its global conservation status is Endangered (IUCN 2014).

Conservation status: In an evaluation of Costa Rican native plant species using IUCN red list criteria ESTRADA CHAÑARRÍA et al. (2005) designated *D. oleifera* as Vulnerable. The species has not yet been assessed globally for the red list through the IUCN.

The main threats to this species are the loss of habitat by conversion into for example pineapple plantations, clearing for pasture and small-scale farming and logging (FRAIXEDAS et al. 2014, HANSON 2006).

In 1996 the Ministry of Environment and Energy in Costa Rica published the decree No. 25167 which restricted the use and logging of *D. oleifera* in an area between the rivers San Carlos, Sarapiquí and San Juan. The decrees No. 25663 published 18th December 1996 and No. 30961 published 3rd February maintained these restrictions (MADRIZ-VARGAS 2004). In 2008 the exploitation and withdrawal of Almendro trees from the wild was completely banned by the Costa Rican Ministry of Environment and Energy (FRAIXEDAS et al. 2014, ÁVALOS 2008 cited in SCHMIDT 2009).

Collection: The seeds and fruits are collected when they fall off the tree (CHIZMAR FERNANDEZ 2009). Logging is done selectively taking only the largest trees. This method has great consequences for the great green macaw as it not only removes food availability but moreover withdraws the limited nesting sites.

Utilization: *D. oleifera* has got a very hard, durable wood, which makes it economically interesting. It reaches highest prices on local markets (RODRIGUEZ & CHAVES 2008). The wood can be used among others for industrial floors, marine construction, boats, machines and sport equipment (FOURNIER 2002). In addition the oil extracted from the mesocarp is used in soap production. The seeds are roasted and eaten like dry fruit or almonds or ground to mix a beverage with e.g. coconut water or milk. As for its pretty pink flowers the almendro has also potential as an ornamental (CHIZMAR FERNANDEZ 2009).

Wood: A distinction of the different species of *Dipteryx* based on macroscopic wood properties is not possible (GESAMTVERBAND DEUTSCHER HOLZHANDEL s. dat.). As mentioned above, the wood is very hard and heavy with a specific gravity of 0.83 to 1.09. The sapwood is whitish in green condition and brown-yellow when dried, whereas the heartwood is yellow when green and gets a yellow-red colour in dry condition (FOURNIER 2002). There are different opinions concerning the transition between sapwood and heartwood. Fournier (2002) states that there is no clear transition whereas the GESAMTVERBAND DEUTSCHER HOLZHANDEL (s. dat.) says there is an abrupt transition. The grain is strongly interlocked and growth rings are poorly defined but pores are visible. The wood has a waxy texture. Due to its hardness it is difficult to cut and process (FOURNIER 2002) but fits as a substitute for Bongossi, Balau, Greenheart (only freshwater), Moabi and others (GESAMTVERBAND DEUTSCHER HOLZHANDEL).
**Trade**: Freely accessible trade data on *D. oleifera* are scarce. The CITES trade database gives information at least on trade since the listing by Nicaragua in 2007. But these data do not have to be complete as they are often based on given permits while the actually traded quantity can be lower.

Overall known traded quantities are not very high. By far the largest exporter is Nicaragua. Most trade is between Costa Rica and Nicaragua, especially since Costa Rica banned the use of *D. oleifera* from the wild in 2008. Importers outside of Central America are the United States and Germany. Nearly all goods come from wild populations or are traded illegally. Only Costa Rica exported a small amount of artificially propagated timber in 2010.

**Table 1**: Trade data on *Dipteryx oleifera* from 2007 to 2011 by the CITES trade database (http://trade.cites.org/).

<table>
<thead>
<tr>
<th>Year</th>
<th>App.</th>
<th>Importer</th>
<th>Exporter</th>
<th>Importer reported quantity</th>
<th>Exporter reported quantity</th>
<th>Term</th>
<th>Unit</th>
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**Artificial propagation**: There are some commercial and experimental plantations in Costa Rica (OFI-CATIE 2003), but there is no information on the extent of cultivation available.

For information on cultivation practices the Árboles de Centroamérica Project is a good source. It was established by the Oxford Forestry Institute (OFI) and the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) and provides a source book for farm planting and ecological restoration of Mesoamerican tree species. This book includes cultivation advice and information on biology and use of the trees.
References


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HANSON, T., 2006. Effects of habitat fragmentation on the reproductive ecology and conservation genetics of the almendro (Dipteryx panamensis), a keystone rainforest tree. Phil. Diss., University of Idaho.


MADRIZ-VARGAS, B., 2004. Relación de dependencia directa para la alimentación y anidación de la lapa verde (*Ara ambigua*) y el almendro (*Dipteryx panamensis*) en la zona norte de Costa Rica. Informe de consultoría presentado a la Comisión Interna del SINAC y FONAFIFO.


