



# Pongamia

Family:	Fabaceae
Sub Family:	Faboideae
Genus and species:	<i>Pongamia pinnata</i>
Common name(s):	Pongam Tree, Indian Beech
Synonyms:	<i>Pongamia glabra</i> , <i>Millettia pinnata</i> , <i>Derris indica</i>



Pongamia is a legume tree with seeds containing oils and fatty acids suitable for biodiesel production. It is now currently being researched by the *ARC Centre of Excellence for Integrative Legume Research* as a feedstock for the biodiesel industry.



Due to its hardy nature Pongamia is often planted in urban streetscapes

## Biogeography

Pongamia is native to a number of countries including India, Malaysia, Indonesia, Taiwan, Bangladesh, Sri Lanka and Myanmar. It has also been naturalised in parts of eastern Africa, northern Australia and Florida.

Pongamia has a varied habitat distribution and can grow in a wide range of conditions. Typically it is found in coastal areas, along limestone and rock coral outcrops, along the edges of mangrove forests, tidal streams and rivers. It is hardy and can survive in temperatures from 5 to 50 °C and altitudes from 0 to 1200 m. Due to its deep roots it also has a tolerance for drought and is found in areas with rainfall from 200 to 2500 mm a year. It grows well in both full sun and partial shade and can grow in most soil types.

## Botanical Features

- ◆ Fast growing, medium sized evergreen tree
- ◆ Height: 7—10 m, Stem diameter: 50 - 80 cm
- ◆ Smooth grey-brown bark with vertical fissuring
- ◆ Leaves compound, pinnate and alternate
- ◆ Mature leaves glossy dark green above, pale below
- ◆ New leaves pinkish-red
- ◆ Flowers white, pink or lavender pea-like blossoms, which bloom late spring/early summer
- ◆ Seeds are 1.5 cm long, light brown, oval and contained in clusters of brown, eye-shaped pods
- ◆ Reproduces via seeds but can be cultivated from root suckers
- ◆ Yields from 9 to 90 kg seed/tree
- ◆ Can produce up to 40% oil per seed
- ◆ Approximately 50% of oil is C18:1, which is suitable for biodiesel production
- ◆ Chromosome number: 22



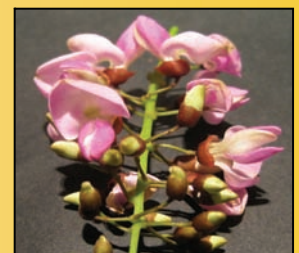
Light brown, oval seeds



A cluster of seed pods



New, pinkish-red leaves



Pea-like blossoms



## Uses of Pongamia:

- ◆ Wood has been used for stove top fuels, poles, and ornamental carvings
- ◆ Bark has been used for paper pulp, twine and as a medicine to reduce swelling of the spleen
- ◆ Flowers are considered good sources of pollen for honey bees, and have been described as having anti-diabetic properties
- ◆ Leaves have been used as cattle fodder, as an infusion to relieve rheumatism and coughing, as an extract to treat itches and herpes and as a source of poison used by Australian Aborigines for fish spears
- ◆ Oil extracted from the seeds has been used as lipids for commercial processes, as an ointment for skin diseases, as a liver medicine, as a lamp fuel in India, and for the production of biodiesel (see below)
- ◆ Seed cake leftover after oil extraction has been used as 'green manure' as it is rich in protein and nitrogen



A pongamia nursery



Pongamia is being grown in Central Old, Australia, for future biodiesel production

### Pongamia as a source of biodiesel ...

As Pongamia has a high oil content (approx. 40%) and can grow on malnourished soils with low levels of nitrogen and high levels of salt, it is fast becoming the focus of a number of biodiesel research programs. Some of the advantages of Pongamia are: a higher recovery and quality of oil than other crops, no direct competition with food crops as it is a non-edible source of fuel, and no direct competition with existing farmland as it can be grown on degraded and marginal land. As a legume it is also able to fix its own nitrogen from the soil, minimising the need for added fertilisers. Whilst there are marked advantages in the use of Pongamia for biodiesel, many considerations are needed in addressing the world's complex energy situation. The ARC Centre of Excellence for Integrative Legume Research is currently investigating the potential of Pongamia as one avenue for sustainable fuel production.

#### References:

1. Duke, A (1985) Handbook of Energy Crops, *unpublished*. Available at: [www.hort.purdue.edu](http://www.hort.purdue.edu)
2. USDA, ARS, National Genetic Resource Program, *Germplasm Resources Information Network - (GRIN)* [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. Available at: [www.ars-grin.gov](http://www.ars-grin.gov)
3. Agroforestry Database: World Agroforestry Centre, *Pongamia pinnata*. Available at: [www.worldagroforestrycentre.org](http://www.worldagroforestrycentre.org)
4. Scott, PT., Pregelj, L., Chen, N., Hadler, JS., Djordjevic, MJ and Gresshoff, PM (2008) *Pongamia pinnata*: an untapped resource for the biofuels industry of the future. *Bioenergy Research* 1: 2-11.

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