



VARIATION IN POD YIELD, SEED CHARACTERISTICS AND OIL CONTENT IN SELECTED PLUS TREES OF *PONGAMIA PINNATA*

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ABSTRACT: *Pongamia pinnata* (L.) Pierre is one of the potential biodiesel species, grows in all kinds of soils including degraded and wastelands. A total of 91 high fruit yielding trees of *P. pinnata* were selected in southern part of India. All the selected trees were multiplied clonally and assembled in the clone bank. Pod and seed characteristics and oil content were studied in all the selected trees. Significant variation in pod and seed characteristics and oil content was recorded among the selected trees. The number of pods in one foot branch per tree varied from 17.55 to 90.15. The maximum pod yield of more than 100 kg was recorded in 7 trees and it was found that the tree No IFGTBPP-19 of Dharmapuri showed high fruit yield of 250.55 kg/ tree and high oil content of 30.54 % and identified as potential clone for clonal plantation programme. In addition, the tree No IFGTBPP-44 of Nagapattinam from coastal area exhibited maximum pod weight (402 g), pod area (12.60 cm²), pod length (6.25 cm), pod breadth (2.90 cm) with pod yield of 103.51 kg and oil content 21.60 % was also found to be the best clone for clonal plantation and breeding programme. It was found that out of 91 selected trees, 17 trees showed high pod yield of above 75-250.55 kg/ tree and 21 trees with high oil content of 25 to 33 %. These 38 clones can be used for clonal plantation programme by State Forest Departments and oil industries. The present investigation revealed that the dry areas like Krishnagiri and Dharmapuri and coastal areas are found to be good for high fruit yield.

Keywords: Biodiesel, Clone, Pods, *Pongamia oil*, *Pongamia pinnata*.

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Pongamia pinnata (L.) Pierre belongs to the family Fabaceae is a medium sized evergreen tree commonly called as Karanj or Pungam that generally attains a height of about 15-25 m with a diameter of around 50 cm (Troup, 1921). *P. pinnata* is widely distributed in many countries like, India, Bangladesh, Nepal and Sri Lanka, and introduced to Philippines, Malaysia, Australia, United States and Indonesia. It grows in all kinds of soils including dry, stony, clay, saline, drylands and wastelands. It is a nitrogen fixing tree and thereby enhances the soil fertility. *Pongamia* has long tap root system capable of sourcing water and nutrients well down in the subsoil and it grows with little care without any cattle browsing. It has also been reported that *Pongamia* is having high carbon sequestration potential (Ahmedin *et al.*, 2013).

P. pinnata is an excellent multipurpose tree with each and every part of the tree having specific use. Dried leaves are used in stored grains to repel insects. Leaves are active against *Micrococcus* and the juice is used for cold, cough, diarrhoea, dyspepsia and leprosy

(Muthu *et al.*, 2006). Flowers are used to treat diabetes, roots for cleaning gums, teeth, ulcers and bark for bleeding piles (Duke, 1983). Leaf, flower, pods, seeds, root and bark extracts of *P. pinnata* possessed significant anti-fungal, anti-plasmodial, anti-ulcerogenic and anti-inflammatory activities (Sangwan *et al.*, 2010). The Pungam seed contains about 30 to 40 % of oil and it has similar properties to that of diesel (Heller, 1996), and hence gained the importance as biodiesel and emerging as a viable alternative to fossil fuel. Shrinivasa (1999, 2001) tested the pungam oil for running the engine, and reported that one litre of *Pongamia* oil was found to be equivalent in performance to the same amount of standard diesel fuel and it is identified as a substitute to the diesel. Pungam oil is used as biodiesel in irrigation pumps, power generators, autorickshaws and tractors, and it is blended with diesel and used in cars in Karnataka. There is a heavy demand for the biodiesel from the automobiles and railways. Hyderabad-based Tree Oils India Ltd (TOIL) and a biodiesel extracting unit in Thoothukudi, Tamil Nadu are extracting biodiesel from *Pongamia* seeds. The oil is also used as a lubricant, in