

Growth Characters of *Pongamia pinnata* (L.) Pierre Seedlings Originated from Single and Double Seeded Pods

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Pongamia pinnata (Linn.) Pierre is reported to be the most preferred species for afforestation particularly in southern parts of India, owing to its drought tolerance and adaptability to a wide range of conditions as well as in recent days for its bio-diesel potential. However, this species exhibits significant variation in growth parameters both in nursery and in plantations. Further, pungam also exhibits greater variation in phenology, seed production and quantity/quality of oil in seeds [1]. Investigations are being carried out at Institute of Forest Genetics and Tree Breeding, Coimbatore to reduce such variation through production of superior planting stocks of pungam. This objective was achieved mainly through selection of superior parent tree.

A single parent tree was identified having 100 seed weight of 234 g with 31 per cent of oil content while reported 100 seed weight was 58 to 67 g with 27 per cent oil content. The progenies of the identified single parent tree attained mean height of 28.6 cm (with CV being 9.42%) within a period of three months. However, researchers after studying variation for pungam among 28 single parent families from different agroclimatic zones of Tamil Nadu, reported maximum shoot length of 27.5 cm for one particular family and general mean shoot length for 28 families as 18.5 cm after a period of six months [2].

The identified single parent tree of pungam was observed to produce double-seeded pods (up to 18% of the total pods collected) as well as few

triple-seeded pods. In this aspect, it is reported that the ovaries of *P. pinnata* mostly contained two ovules (95.04% of the flowers) and occasionally three (4.96%) ovules per ovary (N = 121). However, majority of the pods (90%) had only one seed (1.10 ± 0.42 ; N = 267). It is also reported that after fertilization, the early-fertilized ovule suppresses the subordinate one by the strong sink activity. The abortion of embryo is due to manifestation of sibling rivalry [3].

In the endeavour of minimizing the variation in seedling production in Pungam, variation in vigour of seedlings of single-seeded and double-seeded origin was studied and reported in this paper. Observation revealed that mean height of seedlings of single-seeded origin was 30 per cent more than that of double-seeded origin and the difference manifested was statistically significant (Table 1). Further, seedling to seedling variation was also greater in double-seeded origin with CV of 13.8 per cent when compared to single-seeded origin (CV = 8.69%).

Table 1. Variation in mean height of 3-months-old seedlings of single- and double-seeded origin in pungam

	Single seeded	Double seeded
Mean height (cm)	30.0	22.8
Standard error	0.48	0.59
CV%	8.69	13.81

Besides height, other growth parameters were also recorded (Table 2). The results showed that there was, wide variation in 100 seed weight from 234.5g (single seeded) to 153.4 g (double seeded). Authors from Calicut University reported 100 seed weight of 220 g for pungam [4]. With reference to physiological characters, germination in double seeded was 14 per cent higher than the single seeded. Similarly, shoot and root characteristics of seedlings of single-seeded origin was superior to double-seeded origin (Fig. 1).

Table 2. Physiological and morphological traits of single- and double seeded pungam

Seedlings of	100 seed wt. (g)	Germination (%)	Shoot dry wt. (g)	Root dry wt. (g)	Seedling index
Single-seeded origin	234.5	84	3.51	2.75	1.13
Double-seeded origin	153.4	70	2.27	2.20	0.93

Using the morphological parameters, Seedling Quality Index was calculated with the following formula [5].

$$\text{Seedling quality index} = \frac{\text{Total dry weight (g)}}{\text{Shoot height (cm) / collar diameter (mm) + Shoot dry wt./root dry wt.}}$$

The seedlings of single-seeded origin registered higher Quality index (1.13) than the double-seeded origin (Table 2). The reported Mean Quality Index was 0.55 for 6-months-old seedlings of 28-single parent families in pungam [2].

It appears that production of superior and uniform planting stocks in pungam can be achieved through selection of superior parent trees and through usage of single-seeded pods.

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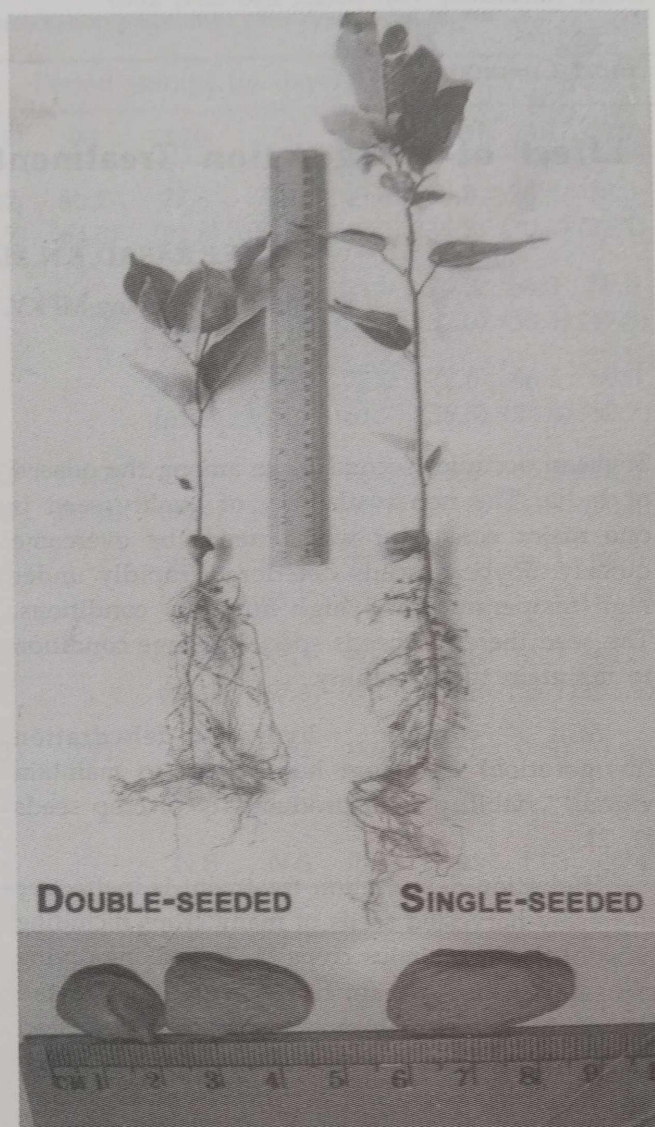


Fig. 1. Seed and seedling of double- and single-seeded origin in pungam

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