Madras Agric. J. 89 (1-3) : 48-51 January-March 2002
https://doi.org/10.29321/MAJ.10.A00181

Standardisation of seed size and polypot for elite seedling production in tamarind (*Tamarindus indica* L.)

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Abstract: Studies were made in *Tamarindus indica* to select seed and polypot size for production of elite seedlings at polypot nursery. The experimental duration was for 90 days. Sowing of bigger size seeds (10.8 mm diameter) in bigger size pots (25x15 cm) could be advantageous. Seedling evaluation in terms of root, hypocotyl and shoot length, number of leaves, stem circumference, drymatter production and vigour index values were higher in large seeds sown in 25x15 cm polypots. *(Key words: Polypot, Seed size, Elite seedlings, Tamarind)*

Production of sufficient quantity of elite seedlings is an important aspect of afforestation programme. Tamarind is one of the multipurpose and zone crop highly useful for culinary and medicinal purposes. Production of quality seedling is warrants attention in seedling and rootstock production. Seed size (Kandya, 1978), container size (Bahuguna and Lal, 1990), pot mixture (Beniwal and Dhawan, 1991) and frequency of irrigation are some of the factors that decide the production of elite seedlings in nursery. Hence studies were initiated with tamarind to study the influence of seed and pot size and seed size on elite seedling production at polypot nursery.

Materials and Methods

Bulk seeds of tamarind collected from Coimbatore were graded using 10.8 mm (G_1-large), 10.0 mm (G_2-medium) and 9.2 mm (G_3-small) round perforated metal sieve. The seeds were separately scarified with commercial sulphuric acid @ 200 ml kg^{-1} of seed for 15 min. The scarified seeds were washed with adequate water, shade dried and used. Two size of polypot *viz.* PP1 (20x10 cm) and PP2 (25x15 cm) selected and were filled with pot mixture by mixing soil: sand : FYM in 2:1:1 proportion. Two seeds were sown in per bag and one was retained after germination. The experimental design was FRBD using 25 polypots with two replications conducted at Tamil Nadu Agricultural University, Coimbatore during 1998.

After 15 days, the nursery germination was recorded and expressed in percentage. At 30, 60 and 90 DAS, three seedlings per replication were removed and observed for the seedling quality characters *viz.* root length (cm), shoot length (cm), number of leaves, stem circumference (cm) at the junction of root and shoot and drymatter production (mg/10 seedlings). No mortality was evident with increase in days of nursery. Vigour index values were computed as per Abdul-Baki and Anderson (1973) for the evaluated test periods of nursery. The results were statistically analysed as per Panse and Sukhatme (1995).

Results and Discussion

Highly significant variations were observed among the size of seeds and bags and also for their interactions for all parameters evaluated except for germination in case of polypot size and its interaction with seed size. The germinability of seeds at nursery expressed that larger size seeds had a positive association with germination. Katsuka (1964) opined that translocation of reserve from endosperm to embryo proceeds differently in large and small seeds, better filed, large seeds of *Pinus thunbergii* transformed more nitrogen from the endosperm to the embryo after sowing than the small seeds. Srimathi (1997) obtained similar results in fruit amla, ber and jamun obtained in polypot nursery. The seedling quality parameters evaluated in terms of roots and shoot length (Table 1), number of leaves, stem. circumference, drymatter production and computed vigour index (Table 2) were more in larger size seeds than in smaller size seeds. The vigour index values computed were 10.5 and 41 per cent higher in larger size seeds compared to medium and smaller size seeds respectively. The stem circumference, criteria for selection of seedlings for root stock production was also more in large size seeds

Table 1. Influence of container size and seed size on germination (%), root length (cm), hypocotyl length (cm) and shoot length (cm) of tamarind of nursery

Polypot (PP)	Grade (G)	Germination (%)	Root length (cm)				Hypocotyl length (cm)				Shoot length (cm)			
			Days after sowing (DAS)											
			30 DAS	60 DAS	90 DAS	Mean	30 DAS	60 DAS	90 DAS	Mean	30 DAS	60 DAS	90 DAS	Mean
PP_1	G_1	90 (71.57)	27.6	28.3	29.8	28.6	15.3	16.3	16.9	16.2	30.0	32.7	36.1	32.0
	G_2	85 (67.21)	26.9	27.6	28.7	27.7	14.5	15.2	16.0	15.2	28.7	29.8	32.6	30.4
	G_3	73 (58.69)	23.7	24.7	26 8	25.1	13.8	14.9	15.5	14.7	27.6	28.8	30.0	28.8
	Mean	83 (65.65)	26.1	26.9	28.4	27.1	14.5	15.5	16.1	15.4	28.8	30.4	32.9	30.4
PP_2	G_1	90 (71.57)	28.1	29.1	30.3	29.2	16.0	16.8	17.4	16.7	30.6	32.8	33.4	32.3
	G_2	85 (67.21)	27.3	28.1	29.8	28.4	15.1	16.0	16.8	16.0	30.0	31.6	32.5	31.4
	G_3	73 (58.69)	25.0	26.0	28.1	26.4	14.4	15.1	16.2	15.0	28.6	29.7	31.8	30.0
	Mean	83 (65.65)	26.8	27.7	29.4	28.0	15.2	16.0	16.8	15.9	29.7	31.4	32.6	31.2
GxPP	G_1	90 (71.57)	27.9	28.7	30.1	28.9	15.7	16.6	17.2	16.5	30.3	32.8	34.8	32.2
	G_2	85 (67.21)	27.1	27.9	29.3	28.1	14.8	15.6	16.4	15.6	29 - 4	30.7	32.6	30.9
	G_3	73 (58.69)	24.4	25.4	27.5	25.8	14.1	15.0	15.9	14.9	28.1	29.3	30.9	29.4
	Mean	83 (65.65)	26.5	27.3	28.9	27.6	14.8	15.7	16.5	15.7	29.3	30.9	32.7	30.8
	G	PP	GxPP	G	PP	DAS	G	PP	DAS	G	PP	DAS		
CD (P=0.05)	(1.70)	NS	NS	0.28	0.23	0.23	0.28	0.17	0.21	0.28	0.28	0.29		
				GxPP	GxDAS	PPxDAS	GxPP	GxDAS	PPxDAS		GxPP	GxDAS	PPxDAS	
				2.68	2.77	2.53	0.14	0.18	0.22		0.29	0.33	0.37	

Table 2. Influence of container size and seed size on number of leaves, stem circumference (cm), drymatter production (mg 10 sdl^{-1}) and vigour index of tamarind at nursery

Polypot (PP)	Grade (G)	Number of leaves				Stem circumference (cm)				Dry matter production (mg 10 sdl^{-1})				Vigour index			
		Days after sowing (DAS)															
		30 DAS	60 DAS	90 DAS	Mean	30 DAS	60 DAS	90 DAS	Mean	30 DAS	60 DAS	90 DAS	Mean	30 DAS	60 DAS	90 DAS	Mean
PP_1	G_1	3	5	6	5	0.9	1.1	1.4	1.1	420	440	458	439	5140	5486	5928	5518
	G_2	2	4	5	4	0.7	0.9	1.2	0.9	393	405	419	406	4717	4879	5206	4934
	G_3	1	2	3	2	0.6	0.7	0.9	0.7	343	360	378	360	3071	3902	4140	3704
	Mean	2	4	5	4	0.7	0.9	1.1	0.9	385	402	418	402	4309	4756	5091	4719
PP_2	G_1	4	5	6	5	1.2	1.4	1.5	1.4	436	471	482	463	5280	5567	5741	5529
	G_2	3	4	5	4	0.8	1.0	1.2	1.0	415	425	436	425	4829	5075	5291	5065
	G_3	2	3	4	3	0.7	0.8	1.0	0.9	356	388	398	381	3906	4056	4360	4107
	Mean	3	4	5	4	0.9	1.0	1.2	1.1	402	428	439	423	4672	4899	5131	4900
	G_1	4	5	6	5	1.0	1.2	1.4	1.2	428	456	470	451	5210	5527	5835	5524
	G_2	3	4	5	4	0.8	0.9	1.2	1.0	404	415	428	416	4773	4977	5249	5000
	G_3	2	3	4	3	0.6	0.7	0.9	0.8	350	374	388	371	3489	3979	4250	3906
	Mean	3	4	5		0.8	1.0	1.2		394	415	429	4490	4828	5111		
		G	PP	DAS		G	PP	DAS		G	PP	DAS		G	PP	DAS	
CD (P=0.05)		0.51	0.66	0.49		0.07	0.05	0.06		2.95	3.80	3.80		346.52	129.90	156.78	
		GxPP	GxDAS	PPxDAS		GxPP	GxDAS	PPxDAS		GxPP	GxDAS	PPxDAS		GxPP	GxDAS	PPxDAS	
		0.59	0.68	0.59		0.07	0.07	0.09		3.84	3.86	3.41		156.78	158.21	159.00	

and was 20 and 50 per cent higher than medium and smaller size seeds respectively. Saraswathy and Baskaran (1976) in Rubber, Pugalendhi *et al.* (1990) in Cashewnut observed similar increment of seed and seedling characters owing to the selection of larger size seeds in polypot nursery.

Germination percentage of seeds did not vary with polypot size but all the characters were more in bigger size pots than smaller size pots (Table 1). The root length, shoot length, hypocotyl length, stem circumference, drymatter production of seedlings and vigour index values were 3.3, 2.6, 3.2, 22.01 5.0 and 3.8 per cent higher in bigger size polypots compared to smaller size polypots (Table 1 and 2) which might be attributed to the availability of more space and nutrients in bigger size containers. Rajasingh (1987) and Misra and Jaiswal (1993) in several tree species emphasised the need for selection of larger size polypot for elite seedling production. Based on the results, selection of seeds retained in 10.8 mm round perforated metal sieve for seeds in larger polypots of size 25 x 15 cm, which could also easily transportable to other places, can be recommended.

References

Abdul-Baki, A.A. and Anderson, J.D. (1973). Vigour determination in soybean seed by multiple criteria. *Crop Sci.* **13**: 630-633.

Bahuguna, V.K. and Lal, P. (1990). To study the effects of environment and different soil mixture on germination of *Acacia nilotica* seed at nursery stage. *Indian For.*, **116**: 474-478.

Beniwal, B.S. and Dhawan, V.K. (1991). Standardization of nursery technique (use of different germination media and watering methods) of *Anthocephalus chinensis*. *Indian For.*, **117**: 105-109.

Kandya, A.K. (1978). Relationship among seed weight and various growth factors in *Pinus oocarpa* Schiede seedling. *Indian For.*, **104**:561-567.

Katsuka, M. (1964). Distribution of nitrogenous compounds in seedlings of *Pinus thunhergii* developed for seeds of different weight. In:Physiological basis of seed germination (Ed.) K.E. Ovcharrov Amerind Publishing Co., New Delhi.

Misra, K.K. and Jaiswal, H.R. (1993). Effect of size of polyethylene bags and potting mixtures on survival and growth of silvar oak *(Grevillea robusta* Parker) seedlings. *Indian For.*, **119**:941-943.

Panse, V.S. and Sukhatme (1995). Statistical Methods for Agricultural workers. ICAR, New Delhi, pp. 330.

Pugalendhi, L., Ahmed Shah, H., Manoharan, V. and Manivannan, K. (1990). Studies on seedlings vigour in cashew. *S. Indian Hort.*, **38**:129-132.

Rajasingh, N.A.M. (1987). Seed technological studies in ten species of sylvicultural importance. M. Sc.(Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore.

Saraswathy, A. and Baskaran, C.K. (1976). Relationship of seed weight and seedling vigour in Hevea. *Rubber Board Bulletin*, **13**: 28-29.

Srimathi, P. (1997). Research focus on seed collection, processing and storage of Amla (*Emblica officinalis*), Jamun (*Syzygium cuminii*) and Ber *(Zizuphus mauritiana)*. Ph.D. Thesis, Tamil Nadu Agricultural University, Coimbatore.

(Received: December 2000; Revised: October 2001)