Journal of Root Crops
Indian Society for Root Crops
ISSN 0378-2409, ISSN 2454-9053 (online)
Journal homepage: https://journal.isrc.in

Influence of mini seed corms and spacing in elephant foot yam on corm size and yield

Elephant foot yam (*Amorphophallus paeoniifolius* Dennst.) belongs to family Araceae is an important tuber crops, a cheap source of energy with many medicinal benefits like stomachic, restorative and carminative. Due to its high photosynthetic efficiency and high dry matter production capability per unit area, substantial yields may be obtained even under poor and marginal soils under harsh climatic conditions. In India, it is grown in an area of 30,000 hectares with a production of 7.74 lakh tonnes and productivity of 25.80 t ha^{-1} respectively (Hort. Stat, 2018). Conventionally, elephant foot yam is propagated through corms and cormels, due to the high seed corm rate of 5 to 7 tonnes per hectare about 25 percent of the harvested corms is used as source of planting material. Through mini corm technique, multiplication ratio could be enhanced from 1:3 to 1:5 (Rajib et al., 2008). Further, due to increase in urbanization and nuclear family concept, there is a need to produce smaller to medium sized corms in elephant foot yam under closer spacing system.

The experiment was carried out at the College Orchard, Department of Vegetable Science, HC&RI, TNAU, Coimbatore. Planting was done during 2022 in a Randomized Block Design with ten treatments and the trial was replicated thrice. In the seed corms central bud located on the top of the corms sprouts first and the earliest due to apical dominance other buds remain dormant. Hence, retaining the portion of the central bud cutting vertically is essential for higher percentage of sprouting. The seed corm of CO 1 variety was used in sizes of 100 g, 150 g, 200 g and planted in the spacing of 30 × 30, 45 × 30, 45 × 45 cm respectively. Observations on vegetative parameters recorded at sixth month after planting *viz*., pant height (cm), pseudo-stem girth (cm), canopy spread (cm), number of cormels $corm^{-1}$, diameter of corms (cm), corm yield (kg $plant^{-1}$), corm yield (kg $plot^{-1}$), corm yield (t ha^{-1}). Recorded data were subjected to statistical analysis with AGRES software. The statistical analysis of data consisted of analysis of variance (ANOVA) for growth and yield parameters.

Results of the study revealed that all the treatments were significantly different from each other. Larger seed corm size at the wider spacing in the treatment T10 -750g; 90 × 60cm recorded the highest values at four months after planting and six months after planting for plant height (53.39cm ; 63.00cm), pseudo stemgirth (8.10cm;10.55 cm) and canopy spread (83.76cm ; 102.23cm), respectively. It is followed by T9 (200g under 45 × 45cm spacing) for the above characters (Table 1). For the corm characters, the highest corm diameter and corm yield per plant recorded in T10 (750 g 90 × 60cm) with 16.78cm and 3.42 kg followed by T9 (200 g in 45 × 45cm) with 15.90 cm and 1.74 kg respectively. Among the treatments T7 (200 g in 30 × 30cm) recorded the highest plot yield of 25.60 kg and estimated yield of 49.54 t ha^{-1} and it is on par with the treatment T9 with plot yield of 25.01 kg estimated yield 48.88 t ha^{-1} respectively. However, T10 is on par with T9 with respect to estimated yield 47.42 t ha^{-1} (Table 2). These results are in agreement with Saravaiya et al*.,* (2010). According to Patel et al*.,* (2013) in three different spacing 60 × 60cm, 75 × 50cm, 75 × 60cm with three corm sizes 250 g, 500 g, 750 g with the variety Gajendra, revealed that planting 500 g seed corm size at 75cm × 60cm spacing was the most effective for getting higher corm yield and corm girth of 71.52 t ha^{-1} and 72.94cm, respectively.

Hence, it is concluded that for production of medium sized corms suitable for nuclear family 200g seed corms planted in 45 × 45cm (T9) is sufficient with the estimated yield of 48.88 t ha^{-1} which recorded 3.1% yield increase over the control treatment (T10) with highest benefit cost ratio of 5.67. There was uniform establishment and less weed competition due to the closer spacing adopted. Similar results were obtained by farmers of Pathanamthitta district of Kerala who received 35% extra price for the small tubers (Prabhu, 2016). The

Table 1. Influence of elephant foot yam for growth characters under different spacing and seed corm size

Treatments		Plant height (cm)		Pseudo stem girth (cm)		Canopy spread (cm)	
		4 MAP	6 MAP	4 MAP	6 MAP	4 MAP	6 MAP
T1	100g 30 × 30cm	33.93	42.39	7.93	8.95	60.10	71.19
T2	100g 45 × 30cm	33.29	37.89	6.31	7.77	58.20	78.55
T3	100g 45 × 45cm	30.18	37.70	7.02	8.73	61.10	68.47
T4	150g 30 × 30cm	30.41	34.70	7.02	8.31	63.97	78.21
T5	150g 45 × 30cm	33.28	37.29	6.73	8.20	70.81	79.36
T6	150g 45 × 45cm	42.94	48.89	6.63	8.19	72.78	84.53
T7	200g 30 × 30cm	49.23	56.37	7.15	8.87	77.29	89.93
T8	200g 45 × 30cm	51.36	57.32	7.38	8.91	72.41	81.46
T9	200g 45 × 45cm	52.30	58.87	7.76	9.53	74.91	87.94
T10	750g 90 × 60 cm	53.39	63.00	8.10	10.55	83.76	102.23
SE(m)		1.20	1.33	0.06	0.32	1.14	2.69
CD		3.50	3.88	0.19	0.96	3.19	7.99
CV (%)		6.94	6.63	1.52	6.40	2.85	5.67

Table 2. Influence of elephant foot yam for corm yield characters under different spacing and corm size

Treatment		Corm diameter (cm)	Corm yield plant^{-1} (kg)	Corm yield plot^{-1} (4 m^2) (kg)	Corm Yield (t ha^{-1})	Percent yield Increase or decrease over T10 (control)	BCR
T1	100g - 30 × 30cm	11.81	0.72	14.86	26.72	-43.7	2.89
T2	100g - 45 × 30cm	14.41	0.84	15.93	28.40	-40.1	3.88
T3	100g - 45 × 45cm	13.39	0.91	16.92	31.39	-33.8	4.10
T4	150g - 30 × 30cm	14.64	0.97	19.89	39.91	-15.8	3.23
T5	150g - 45 × 30cm	15.01	1.10	21.09	42.79	-9.8	4.15
T6	150g - 45 × 45cm	15.49	1.27	22.54	45.60	-3.8	4.32
T7	200g - 30 × 30cm	15.36	1.63	25.60	49.54	4.5	3.20
T8	200g - 45 × 30cm	15.41	1.36	21.59	43.36	-8.6	3.72
T9	200g - 45 × 45cm	15.90	1.74	25.01	48.88	3.1	5.67
T10	750g - 90 × 60 cm	16.78	3.42	20.52	47.42	-	4.39
SEm		0.24	0.08	0.15	0.71		
CD		0.73	0.24	0.46	2.11		
CV(%)		2.89	10.29	1.47	3.06		

use of sprouted small corms is more economical as the 1.5-2.0 kg sized tubers produced using the pre-sprouted corms, received better price in the market, compared to bigger tubers produced using the bigger sized seed corms.

Acknowledgement

The authors are grateful for the support rendered by the Department of Vegetable Science, HC&RI, TNAU, Coimbatore and ICAR, AICRP on Tuber Crops, ICAR-CTCRI, Thiruvananthapuram for financial support.

References

Horticultural Statistics at a Glance 2018. pp10. www.agricoop.nic.in.

Patel, J.C., Patel, B. and Saravaiya, S. N. 2013. Growth, corm yield and quality of Elephant foot yam cv Gajendra as influenced by Plant Density and Corm size, In: *Aroids: Opportunities and Challenges*, Allied Publishers, Mumbai, pp.190.

Prabhu.2016.https://www.thehindu.com/sci-tech/science/better-profits-with-smaller-sized-tubers/article6679874.ece

Rajib Nath, Kundu, C.K., Majumder, A., Gunri, S., Biswas, T.S. K. and Islam, A. 2007. Seed corm multiplication of elephant foot yam through mini corm setts in laterite ecosystem of Eastern India. *J. of Root Crops*., **33**: 30-37.

Saravaiya, S.N., Chaudhari, P.P., Chauhan, G.G., Patel, N.B., Patel, K.A. and Chaudhari, J.H. 2010. Influence of spacing, time of planting and seed corm size on yield of elephant foot yam (*Amorphophallus paeoniifolius* (D.) Nicolson) cv. Gajendra under south Gujarat conditions, *Asian J. Horticulture*, **5**: 119-120.

Department of Vegetable Science, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

*Corresponding author: Dr. C. Thangamani
Email: thangamani.c@tnau.ac.in
Ph: +91 9976313927

C. Thangamani*
L. Pugalendhi
P. Pavithra
M. Kavitha
N.A. Tamilselvi