ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 6, Issue 4, pp: (100-102), Month: October - December 2018, Available at: www.researchpublish.com

EVALUATION OF GENOTYPE BASED ON SEED WEIGHT FOR THE ROOTSTOCK PRODUCTION IN JACK (*Artocarpus heterophyllus* LAM.)

[1]T. UMA MAHESWARI, [2]K. NIVETHA

[1,2] Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalainagar-608 002 (Tamilnadu), India

Umahorti2003@gmail.com

Abstract: **An experiment was carried out to evaluate the genotype and standardize the seed weight on root stock production was laid out in a Factorial completely randomized block design, replicated thrice with twenty treatment combinations. It consisted of five different genotypes of jack collected from Panruti (G1), Virdhachalam (G2), A. Puthur (G3), Kadampuliyur (G4) and Neyveli (G5) with four different seed weight 4 g (W1), 5 g (W2), 6 g (W3) and 7 g (W4). The results of the experiment revealed that, among these genotypes, G1 (AH-1) was the promising one in achieving maximum value for the characters like, shoot length, number of leaves, leaf area, stem girth, vigour index and fresh weight of the seedlings which was followed by G4 (AH-4). Among the various seed weight tried, the above said characters were favourably enhanced by W4 (7g) followed by W3 (6g). Among the various factorial combinations, rootstocks produced from 7g seed of Panruti collection (G1W4) recorded the maximum values for these growth characters. This was followed by 7g seed of Kadampuliyur collection achieved (G4W4) the next best value for these characters.**

Keywords: **Jack, Rootstock, Genotype, Seed weight.**

1. INTRODUCTION

Jack is an important fruit crop grown in tropical and subtropical region. The fruit is highly nutritive, being a staple food, it is very popular among the poor classes and house wives for culinary preparations. It is known as the poor man's food, in the eastern and southern parts of India. It is generally grown in the backyards and in the coffee and cardamom plantation as shade trees. It has not received much attention towards crop improvement and standardization of cultural practices. Jack fruit tree is widely grown in southern states *viz.*, Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. It is also cultivated in other states like Assam, Bihar, Orissa, Maharashtra and West Bengal. The total area under jackfruit cultivation in India is around 32,600 ha. In Tamil Nadu, it is grown in an area of about 1.882 ha. The success of grafting is depending on the good quality as well as the better performance of the rootstocks. Hence, an investigation was conducted to evaluate the performance of various genotypes and weight of the seeds for good quality rootstock production.

2. MATERIALS AND METHODS

The Experiment was conducted in the Department of Horticulture, Faculty of Agriculture, Annamalai University during 2013-2015. The experiment was conducted in the factorial completely randomized block design replicated thrice. The present study has been taken up, by screening the various genotypes available around the Cuddalore district, where this crop is very popularly grown on large scale. Among the wide variability in genotype, five of them have been identified for assessing their ability to be used as rootstocks. Along with this, four different seed weight of these genotypes were used for rootstock production and to find out the performance of rootstocks. Based on the performance of rootstock, best genotype with suitable seed weight was evolved.

Five jack genotypes were collected from various places of cuddalore district of Tamil Nadu, which is the major jack growing area where could observe more variability on fruits, seed size and quality. The genotypes have been coded as mentioned below: AH – 1 from Panruti (AH- *Artocarpus heterophyllus* Lam.), AH – 2 fromVridhachalam, AH – 3 from A.Puthur, AH – 4 from Kadampuliyur and AH – 5 from Neyveli. Jack seeds were collected from fully ripened healthy fruits. Seeds weighing 4 to 7g were collected and used for raising seedlings. Seeds were extracted from the fruit and thoroughly washed with water to remove their slimy coating and soaked in water for 24 hours to enhance germination. Polythene bags of 200 gauge 25 x 15 cm thickness were used for raising jack rootstocks. The pot mixture comprised of sand, red earth and farm yard manure (FYM) in equal proportion. The selected, healthy seeds from the five genotypes were laid flat on the medium with their hilum part facing down. The seeds which were sown in the polythene bags were maintained in the shade net with necessary care. Watering was done once in two days for the seeds which were sown in the polythene bags. Germination of seeds started from 15 days to 20 days after sowing and continued for 30 to 40 days.

3. RESULTS AND DISCUSSION

The data pertaining to shoot length, number of leaves, leaf area, stem girth, vigour index and fresh weight of the seedlings was recorded and presented in table 1. Among the different genotypes, G1 registered the maximum shoot length (34.91 cm) and this was followed by G4 (34.62 cm). The least value was (33.75 cm) observed in G3. Among the different seed weight, W4 showed the maximum shoot length (37.17 cm). The lowest shoot length was (32.56 cm) was observed in W1.The combination of different genotypes and seed weight showed the maximum shoot length in G1W4 (37.90 cm), this was followed by G4W4 (37.54 cm). The minimum value was (32.12 cm) recorded in G3W1.

However, combination of genotypes and seed weight showed that, the highest value for vigour index was recorded in G1W4 (2974.22). This was followed by G4W4 (2813.40) and minimum was observed in G3W1 (1633.34).

The height of seedlings differed from various seed groups in terms of weight had significant difference. The initial vigour of nursery plants through simple seed selection thought to be taken advantage from the standpoint of ultimate utilization of rootstock seedlings for grafting purpose. It is generally agreed that larger seeds tend to produce larger seedlings. Similar result obtained by Olorunmaiye *et al.* (2011) in mango revealed that the greater stem height was obtained from seedling emerged in very heavy weight seed groups, while the shortest height was obtained in small seed weight. Similarly seedling vigour was closely associated with the seed weight. Big sized seed possess high germination potential and produced more vigorous seedlings. Khan (2003) reported that large sized seeds germinated faster and achieved greater germination percentage and vigour than small seeds. Rapid and greater germination of heavy seeds might be attributed to large food reserves of these seeds. Seedlings from large seeds have sufficient reserves to sustain growth for a much longer period as reported by Saverimuttu and Westoby (1996). Differences in seed content such as starch and proteins are responsible for germination and differences of the above ground portion of the seedling, while physiological processes are involved in breaking dormancy or onset of germination as reported by Dyer (2004).

The maximum number of leaves was observed in G1W4 (10.86) and this was followed by G4W4 (10.34). The lowest number of leaves was (5.24) recorded in G3W1. The interaction with various genotypes and seed weight showed, the maximum leaf area was observed in G1W4 (53.99 cm^2). The minimum leaf area was observed in G3W1 (48.34 cm^2).

The combination of different genotypes and seed weight exhibited significant differences on stem girth. The maximum stem girth was observed in G1W4 (1.96 cm). The minimum value was (1.02 cm) recorded in G3W1.

The combination of genotypes and seed weight showed, the maximum fresh weight in G1W4 (19.90 g) and it was followed by G4W4 (19.41 g). The lowest value for fresh weight was observed in G3W1 (15.90 g).

The similar result obtained by Aliyu and Akintaro (2007) in cashew revealed that number of leaves and stem girth, consistently ranked highest in the seedling derived from heavy sized nut. Fresh weight of the seedlings was much higher in 7 g weight of the seed than 4 g seed weight. This might be as a result of greater vigour of seedlings due to large amount of food reserves in heavy seeds as reported by Olorunmaiye *et al*. (2011) in mango.

It is concluded that based on the observations, among the five genotypes tried, AH -1 collected from Panruti was adjudged as the promising genotype and 7 g of seed was selected as the suitable seed weight for producing rootstocks.

ISSN 2348-313X (Print)
International Journal of Life Sciences Research ISSN 2348-3148 (online)
Vol. 6, Issue 4, pp: (100-102), Month: October - December 2018, Available at: www.researchpublish.com

REFERENCES

[1] Aliyu, O.M. and G.O. Akintaro.2007. Studies on the effect of storage period and nut size on the seedling vigour of cashew. American Eurasian J. Sci., 2(1): 68-74.

[2] Dyer, A.R. (2004). Maternal and sibling factors induce dormancy in dimorphic seed pairs of *Aegilops triuncialis*. Plant Ecol. 172: 211 – 218.

[3] Khan, M.L. (2003). Effect of seed mass on seedling success in jack (*Artocarpus heterophyllus* Lam.) a tropical tree species of north -east India. Internat J. Ecology. 25: 103-110.

[4] Olorunmaiye, K.S., P.O. Fatoba, P.M. Olorunmaiye and C. Adeyemi. 2011. Seed weight and morpho-physiological parameters in mango (*Mangifera indica* L.) seedlings. Pomologia croatica., 17: 77-86.

[5] Saverimuttu, T., Westoby, M. (1996). Seedling longevity under deep shade in relation to seed size. J Ecol. 84: 681 – 689.

APPENDIX - A

Table 1. Effect of seed weight and evaluation of genotype on shoot length, vigor index and number of leaves in jack

Weight of Seed (W) / Genotype (G)	Shoot length(cm) 90 DAS					Vigour Index 60 DAS					Number of leaves 90 DAS				
	W1 (4 g)	W2 (5 g)	W3 (6 g)	W4 (7 g)	G Mean	W1 (4 g)	W2 (5 g)	W3 (6 g)	W4 (7 g)	G Mean	W1 (4 g)	W2 (5 g)	W3 (6 g)	W4 (7 g)	G Mean
G1 (AH-1)	32.97	33.85	34.93	37.90	34.91	1894.49	2268.21	2486.40	2974.22	2405.80	6.90	7.74	8.83	10.86	8.58
G2 (AH-2)	32.40	33.10	33.90	36.78	34.04	1699.26	2003.30	2158.40	2554.95	2166.74	6.10	7.10	8.00	10.15	7.93
G3 (AH-3)	32.12	32.84	33.57	36.47	33.75	1633.34	1915.91	2024.64	2421.09	2062.01	5.24	6.18	7.14	9.00	6.89
G4 (AH-4)	32.77	33.60	34.60	37.54	34.62	1820.09	2195.62	2391.24	2813.40	2365.17	6.67	7.52	8.67	10.34	8.34
G5 AH-5)	32.58	33.35	34.27	37.18	34.34	1762.56	2116.85	2310.08	2682.31	2218.74	6.44	7.21	8.40	10.21	8.06
W Mean	32.56	33.34	34.25	37.17		1762.56	2099.97	2423.65	2689.19		6.27	7.15	8.20	10.20	

Factor	S.ED	CD (P = 0.05)
G	0.13	0.26
W	0.15	0.31
GXW	0.17	0.35

Factor	S.ED	CD (P = 0.05)
G	19.45	38.90
W	28.76	57.81
GXW	40.68	81.76

Factor	S.ED	CD (P = 0.05)
G	0.08	0.16
W	0.20	0.40
GXW	0.23	0.46

Table 2. Effect of seed weight and evaluation of genotype on leaf area, stem girth and fresh weight of the seedlings in jack

Weight of Seed (W) / Genotype (G)	Leaf Area (cm^2)					Stem girth(cm) 90 DAS					Fresh weight of the seedlings(g)				
	W1 (4 g)	W2 (5 g)	W3 (6 g)	W4 (7 g)	G Mean	W1 (4 g)	W2 (5 g)	W3 (6 g)	W4 (7 g)	G Mean	W1 (4 g)	W2 (5 g)	W3 (6 g)	W4 (7 g)	G Mean
G1 (AH-1)	49.94	50.89	52.89	53.99	51.92	1.32	1.57	1.75	1.96	1.65	16.75	17.92	18.83	19.90	18.35
G2 (AH-2)	48.80	49.66	51.70	52.70	50.71	1.21	1.23	1.44	1.63	1.37	16.04	17.08	18.00	19.09	17.55
G3 (AH-3)	48.34	49.32	51.21	52.18	50.56	1.02	1.09	1.23	1.54	1.22	15.90	16.92	17.90	18.93	17.41
G4 (AH-4)	49.55	50.50	52.45	53.59	51.52	1.28	1.47	1.65	1.80	1.55	16.43	17.57	18.40	19.41	17.95
G5 AH-5)	49.23	50.02	52.08	53.12	51.11	1.23	1.34	1.57	1.74	1.47	16.12	17.45	18.19	19.18	17.73
W Mean	49.17	50.07	52.06	53.11		1.21	1.33	1.52	1.73		16.24	17.38	18.26	19.30	

Factor	S.ED	CD (P = 0.05)
G	0.10	0.21
W	0.14	0.28
GXW	0.15	0.31

Factor	S.ED	CD (P = 0.05)
G	0.042	0.085
W	0.045	0.090
GXW	0.047	0.095

Factor	S.ED	CD (P = 0.05)
G	0.14	0.28
W	0.23	0.46
GXW	0.24	0.49