



EVALUATION OF TAPIOCA GENOTYPES FOR GROWTH AND YIELD PARAMETER

Mangesh Ramesh Deshmukh*, Ganesh Mathaji Bansode, Pallavi Jagannath Mahajan
National Agriculture Research Project, Ganeshkhind, Pune-07, India.

ABSTRACT

The experiment on twenty six tapioca genotypes was laid out to evaluate their performance in terms of root yield. The genotypes significantly differed in respect of root yield plant per plant. The highest root yield ($t\ ha^{-1}$) was recorded by the genotype H-226, a hybrid between a local cultivar and Malayan introduction M-4. H-226 was followed by H-97 which is a hybrid between a local variety and a Brazilian selection. It can be concluded that a significant variation in root yield could be seen in different tapioca genotypes due to their differential behavior in respect of growth, number of roots/plant and yield/plot (kg). Tapioca genotype H-226 gave the maximum root yield of 37.21 ($t\ ha^{-1}$) with SVI (0.82) and B:C ratio of 3.16.

Key word: Tapioca, roots, growth, yield, sustainability yield index, sustainability value index.

*Corresponding email address: mrdes101@yahoo.co.in

Received: 20 February 2019

Accepted: 29 July 2019

INTRODUCTION

Tapioca also known as Cassava (*Manihot esculents Crantz*) is one of the most drought tolerant species among the cultivated plants. It has been grown in India for more than a century. In India Cassava occupies 0.24 million ha area with production of 6.70 million tonnes. Tapioca is mainly used as an industrial raw material for starch and sago manufacture in Tamil Nadu and Kerala. These three states cover 88% of the cultivated area and 99.3% of the production (Sreekumari *et al.*, 1999). Cassava is an important food crop of Kerala often forming lifesaving substances during period of famine. In North Eastern states Cassava is used as a food crop. The area and production under Cassava is gradually increasing. In Maharashtra it is cultivated in Rajgurunagar (200 ha), Shirur (2ha) and Junnar (2 ha) Talukas in Pune district, while Parner (30 ha) and Shrigonda (10 ha) Talukas of Ahmednagar district. Looking into the severity of drought in Maharashtra it was proposed to initiate research work on this drought tolerant crop at National Agricultural Research Project, Ganeshkhind Pune.

MATERIALS AND METHODS

Cuttings of twenty six tapioca genotypes were procured from the regional research station on tuber crops, Bhubaneswar, Orissa and evaluated in rod row trial for their growth and root yield at NARP, Ganeshkhind Pune for three consecutive years (2011-12, 2012-13, 2013-14). The gross plot size was 4.5x2.7m with a spacing of 90x 90 cm. Randomly five plants were sampled for recording the observations on growth and yield parameters. Various observations *viz* plant height (m), average number of roots /plant, root color, weight of roots/plant, root yield/plant (kg) and root yield(t/ha) were recorded. FYM@12 t/ha was applied at the time of planting. Chemical fertilizers @100:100:100 N: P₂O₅; K₂O kg/ha were applied in the form of urea, single super phosphate and muriate of potash. Half N and full of P₂O₅ and K₂O were applied at the time of planting the cuttings with three internodes each. Remaining half N was applied two months after planting.

RESULTS AND DISCUSSION

The pooled data (2011-14) presented in Table 1 and Table 2 indicated that H-226 a hybrid between a local cultivar and a

Malayan introduction M-4 recorded the maximum height of 3.32 m. H-226 also recorded a maximum average of 6.77 roots/plant and a maximum yield of 37.21 t/ha . These results are in agreement with those reported by (Sankaran *et al.*, 2007). H-226 was followed by H-97, a hybrid between a local variety and a Brazilian selection. H-97 recorded an average of 5.72 roots /plant. The roots exhibited a pink color with n yield of 34.64 t/ha . The hybrid CM-9966 recorded an average of 5.73 roots/plant. The roots showed a pink color with a yield of 31.48 t/ha .

It can be concluded from three years pooled data that out of twenty six genotypes of tapioca evaluated at NARP, Ganeshkhind, Pune H-226 recorded the highest root yield (37.21 t/ha). These results are in agreement with those reported by Abraham *et al.* (2000) who stated that hybrid H-226 is the most popular variety in the industrial area of Tamil Nadu and Andhra Pradesh. It cropped can withstand a very high temperature and can be easily grown in drought prone areas. In nontraditional areas of Central India the crop is being introduced through the true seed program. Nevertheless the total area and production of cassava in India is declining,, especially in Kerala due to prominence gained by plantation crops like rubber, black pepper, coffee etc which provide more cash income. Therefore the future increase in cassava production seems possible only by increasing the productivity in the existing areas of cultivation expanding its adoption in different cropping systems and introducing the crop to new nontraditional areas.

CONCLUSION

It Can be concluded from three years pooled date that out of 26 genotypes of tapioca evaluated at NARP, Ganeshkhind, Pune, H-226 recorded the highest root yield (37.21 t/ha) also can withstand a high temperature and can be grown in drought prone areas.

REFERENCES

- Sankaran, M., N. P. Singh, B. Santhosh and J. Prakash, 2007. Technology for tapioca production in tripura. CAR Publication.
Sreekumari, M., J. Jos and S. Nair, 1999. 'Sree harsha': A superior triploid hybrid in cassava. Euphytica, 106(1): 1-6.

Abraham, K., S. Nair and S. Naskar, 2000. Cassava breeding and varietal Development Needs. Proc. 6th Regional Workshop, held in Ho Chi Minh city, dissemination in india-major achievements during the past 25-30 years. In: Vietnam. pp: 174-184.
Cassava's Potential in the 21st Century: Present Situation and Future Research and

Sr. No.	Treatment	Plant height (m) at harvest				Av. no of roots /plant				Color of root 2011-2014
		2011-12	2012-13	2013-14	Average	2011-12	2012-13	2013-14	Average	
1	CE-185	2.66	3.08	2.22	2.65	5.40	5.00	5.50	5.30	Pink
2	H-8/78	2.52	3.03	2.65	2.73	5.00	4.00	5.10	4.70	Milk white
3	H-23/74	2.78	3.62	1.80	2.73	5.00	4.00	5.00	4.67	Pink
4	M-75	3.13	3.50	2.38	3.00	6.20	5.00	6.00	5.73	Milk white
5	CM-142	3.53	3.68	2.55	3.25	4.00	4.00	4.50	4.17	Pink
6	H-119	3.36	2.87	3.20	3.14	5.40	5.00	5.60	5.33	Milk white
7	CI-800	2.90	3.40	2.35	2.88	5.20	5.00	5.00	5.07	Pink
8	TCS	2.91	3.18	2.55	2.88	5.00	5.00	5.25	5.08	Pink
9	69-1	2.71	3.15	1.75	2.54	3.30	3.00	4.00	3.43	Broun
10	CI-823	2.55	3.12	2.05	2.57	4.50	4.00	5.00	4.50	Pink
11	CI-649)	2.60	3.54	2.82	2.99	6.00	5.00	6.00	5.67	Pink
12	H-2304	2.77	3.58	2.95	3.10	6.00	6.00	6.20	6.07	Pink
13	H-1687	2.90	3.12	1.75	2.59	5.00	4.00	5.00	4.67	Yellowish
14	S-856	3.45	3.83	2.40	3.23	4.00	4.00	4.55	4.18	Pink
15	H-5/78	3.44	3.84	2.59	3.29	4.00	4.00	4.00	4.00	Yellowish
16	H-97	3.11	3.92	2.65	3.23	6.00	5.00	6.15	5.72	Yellowish Pink
17	CM-9905	3.08	3.85	1.75	2.89	5.50	5.00	5.50	5.33	Pink
18	M-4	2.76	3.40	1.65	2.60	6.00	5.20	6.20	5.80	Yellowish
19	CM-9966	2.92	3.89	2.22	3.01	6.20	5.00	6.00	5.73	Pink
20	CI-590	3.08	3.72	2.60	3.13	5.00	5.30	5.50	5.27	Pink
21	H-165	2.85	3.40	2.40	2.88	5.00	5.00	5.00	5.00	Pink
22	H-226	3.32	3.50	3.15	3.32	7.00	6.00	7.30	6.77	Yellowish
23	Shribijaya	2.91	3.52	2.30	2.91	6.00	6.30	6.00	6.10	Dark Broun
24	H-165	2.64	2.88	2.40	2.64	5.00	5.20	5.45	5.22	Broun
25	Welyanihirswa	2.17	3.10	1.25	2.17	4.00	4.00	4.00	4.00	Pink
26	Shri Rekha	2.81	3.22	2.40	2.81	4.00	4.10	4.50	4.20	Pink
	Max	3.53	3.92	3.20	3.32	7.00	6.30	7.30	6.77	
	Min	2.17	2.87	1.25	2.17	3.30	3.00	4.00	3.43	
	Av	2.92	3.42	2.34	2.89	5.14	4.73	5.32	5.07	
	SD	0.33	0.32	0.47	0.28	0.90	0.77	0.80	0.79	

Table 1: Growth and yield performance of Tapioca varieties (Pooled data 2011-2014).

Sr. No.	Treatment	Wt. of root/plant				Yield /plot (kg)				Yield t/ha			
		2011-12	2012-13	2013-14	Average	2011-12	2012-13	2013-14	Average	2011-12	2012-13	2013-14	Average
1	CE-185	1.74	1.65	3.50	2.30	25.00	24.20	26.00	25.07	20.58	19.92	21.40	20.63
2	H-8/7	2.25	2.10	2.83	2.39	29.34	28.75	31.50	29.86	24.15	23.66	25.93	24.58
3	H-23/74	1.37	1.25	2.00	1.54	20.69	20.00	21.50	20.73	17.03	16.46	17.70	17.06
4	M-75	2.41	2.25	2.85	2.50	32.50	31.55	33.00	32.35	26.75	25.97	27.16	26.63
5	CM-142	1.98	1.65	1.50	1.71	28.80	28.00	29.50	28.77	23.70	23.05	24.28	23.68
6	H-119	2.30	2.20	3.50	2.67	32.97	32.35	33.25	32.86	27.14	26.63	27.37	27.04
7	CI-800	2.60	2.45	2.70	2.58	29.00	28.45	31.00	29.48	23.87	23.42	25.51	24.27
8	TCS	1.66	1.45	3.50	2.20	20.50	20.00	22.00	20.83	16.87	16.46	18.11	17.15
9	69-1	2.21	2.15	1.00	1.79	30.00	30.00	31.50	30.50	24.69	24.69	25.93	25.10
10	CI-823	2.00	1.95	1.75	1.90	28.00	27.30	29.25	28.18	23.05	22.47	24.07	23.20
11	CI-649)	2.00	2.00	2.75	2.25	29.00	28.10	30.00	29.03	23.87	23.13	24.69	23.90
12	H-2304	2.10	1.95	2.25	2.10	31.00	30.55	31.25	30.93	25.51	25.14	25.72	25.46
13	H-1687	2.20	2.10	0.66	1.65	30.00	29.65	31.00	30.22	24.69	24.40	25.51	24.87
14	S-856	2.25	2.20	3.33	2.59	29.00	29.00	29.80	29.27	23.87	23.87	24.53	24.09
15	H-5/78	2.00	2.00	4.05	2.68	28.00	27.75	29.75	28.50	23.05	22.84	24.49	23.46
16	H-97	2.80	2.70	2.55	2.89	42.00	41.00	43.25	42.08	34.57	33.74	35.60	34.64
17	CM-9905	2.45	2.33	2.55	2.44	32.00	31.25	32.40	31.88	26.34	25.72	26.67	26.24
18	M-4	2.20	2.10	0.91	1.74	32.00	31.00	32.00	31.67	26.34	25.51	26.34	26.06
19	CM-9966	3.10	3.00	2.00	2.70	38.98	37.75	38.00	38.24	32.08	31.07	31.28	31.48
20	CI-590	2.07	2.00	2.62	2.23	28.50	28.00	29.00	28.50	23.46	23.05	23.87	23.46
21	H-165	2.10	2.00	2.50	2.20	31.00	30.00	32.00	31.00	25.51	24.69	26.34	25.51
22	H-226	3.20	3.15	3.66	3.34	45.18	44.25	46.20	45.21	37.19	36.42	38.02	37.21
23	Shribijaya	1.47	1.40	1.16	1.34	20.33	20.00	21.35	20.56	16.73	16.46	17.57	16.92
24	H-165	1.30	1.30	2.50	1.70	21.00	20.50	22.50	21.33	17.28	16.87	18.52	17.56
25	Welyanhirswa	1.90	1.70	0.56	1.39	22.00	21.00	22.50	21.83	18.11	17.28	18.52	17.97
26	Shri Rekha	1.40	1.35	3.33	2.03	21.00	20.00	21.70	20.90	17.28	16.46	17.86	17.20
	Max.	3.20	3.15	4.05	3.34	45.18	44.25	46.20	45.21	37.19	36.42	38.02	37.21
	Min.	1.30	1.25	0.56	1.34	20.33	20.00	21.35	20.56	16.73	16.46	17.57	16.92
	Av.	2.12	2.02	2.42	2.19	29.15	28.48	30.05	29.22	23.99	23.44	24.73	24.05
	S.D.	0.48	0.49	0.99	0.49	6.32	6.22	6.18	6.23	5.20	5.12	5.08	5.13

Table 2: Different growth and yield performance of Tapioca varieties (Pooled data 2011-2014).