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Assessment of cassava varieties in cauvery delta zone of Tamil Nadu for sustainable productivity

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Abstract

A field experiment was conducted at ICAR- Krishi Vigyan Kendra, Thiruvavur, Tamil Nadu to study the performance of cassava varieties under irrigated condition. Three varieties included in the trial were local type, H-226 and Co (TP) 4. Observations on growth parameters and yield traits were recorded during the experiment period from 2013 to 2014. The results revealed that the cassava variety Co (TP) 4 recorded higher values for plant height (224.3 cm), number of primary branches per plant (3.8), number of secondary branches per plant (5.7), stem girth (8.8cm), number of leaves (99.6), number of tubers per plant (14.2), length of tuber (32.5 cm), girth of tuber (15.6cm), single tuber weight (274.6 gm), tuber yield per plant (8.1 kg), tuber yield per hectare (48.6 t/ha) and starch content (28.6%) followed by the variety H-226. The least values for the characters studied were recorded in local adopted check variety. The highest gross returns, net return and B:C Ratio of Rs. 194400/ha, Rs. 129400/ha and 3.0, respectively were realized with Co (TP) 4 as compared to other two varieties under evaluation in Thiruvavur condition.

Keywords: Cassava, varieties, growth, yield component traits

Introduction

Cassava (*Manihot esculenta* Crantz, family Euphorbiaceae) is one of the significant tropical tuber crops and cultivated for its tuberous roots which contain starch. Cassava is a South American originated tuber crop and was introduced from Brazil to India by the Portuguese in the part of the Kerala state, during the 17th century. As per FAO (2008)^[4] report, after rice and maize, cassava is the third largest source of food carbohydrates in the tropics. Besides it is a major staple food crop cultivated in several developing countries. Cassava occupies of 20.73 million ha area globally with 276.72 million tonnes of tubers production (FAO, 2013)^[5]. In India cassava is cultivated in states like Kerala, Tamil Nadu, Andhra Pradesh and North-Eastern hill region (Abraham *et al.*, 2000; Edison, 2000; Sakthivel *et al.*, 2010)^[1, 2, 10] as an sole and inter crop in coconut gardens as well. In Tamil Nadu, the crop is cultivated in plains and hills. In plains cassava is raised under irrigation and in hills, it is purely rainfed and major portion of production goes for industrial use (Edison *et al.*, 2006)^[3]. Under the changing climatic scenario land use pattern, crop selection and technologies adopted has got drastic changes to mitigate the ecological stresses. In many areas non traditional crops are being introduced as alternative crop for the betterment of farming community. The agricultural and horticultural research institutes in different agro-climatic zones is involved in generation of location-specific technologies and testing suitable alternate crops too. Keeping this point in view, the present investigation on assessment of cassava varieties was conducted in Thiruvavur district of Tamil Nadu during 2013-14.

Materials and methods

A field experiment was conducted during the period from 2013 to 2014 at Melanagai village of Mannargudi block, by ICAR-Krishi Vigyan Kendra, Thiruvavur district. The experimental site located at 10° 66' N latitude, 79° 45' E longitude and 6 m above mean sea level. The experimental material comprises three cassava varieties *viz.*, local type, H-226 and Co (TP) 4. The experiment was laid out in a randomized block design (RBD) with seven replications. Ahead of initiating the experiment, the soil was brought to a fine tilt with four deep

ploughings. Weeds, stubbles, roots etc., were removed. At the time of the last ploughing, farm yard manure was applied at the rate of 25 t ha⁻¹. After levelling, ridges and furrows were formed and medium sized sets of 15 cm long with 8 – 10 nodes from the middle portion of the stem were planted at a spacing of 60 m x 60 cm which accommodates 27,777 plants per hectare. Standard cultural practices as recommended by the Tamil Nadu Agricultural University were followed throughout the experimentation. The data were recorded on ten plants from each variety collected at random in each replication for growth, yield and tuber characters and data were analysed statistically (Panse and Sukhatme 1985) [8].

Results and Discussion

Growth parameter

It is apparent from the data presented in Table 1 that among the varieties of cassava, CO (TP) 4 have significant and beneficial effect on growth parameters. Data indicated that maximum plant height (224.3 cm), number of primary branches per plant (3.8), number of secondary branches per plant (5.7), stem girth (8.8cm) and number of leaves (99.6) were recorded in the improved variety CO (TP) 4 followed by H-226. The least values for the growth traits were observed in the local adopted check variety. This positive performance of the variety might be due to production potential of the

improved variety and adoption of scientific agronomical practices leads to improved nutrient availability to growing crop. As the crop grown under irrigated condition, the beneficial effect of improved variety with scientific agronomic practices like nutrient management, weed management etc. results in greater and longer availability of nutrients as per demand of the crop favoured for the improved growth parameters (Sakthivel and Qadri, 2018) [9].

Yield and yield attributes

The mean values of tuber yield and yield attributed characters were presented in the Table 1. Data on the yield parameters revealed that, higher mean values for number of tubers per plant (14.2), length of tuber (32.5 cm), girth of tuber (15.6cm), single tuber weight (274.6 gm), tuber yield per plant (8.1 kg), tuber yield per hectare (48.6 t/ha) and starch content (28.6%) were registered by the improved variety CO (TP) 4 followed by H-226. The higher yield and its attributes of the improved variety CO (TP) 4 under Tamil Nadu condition was also reported by (Velmurugan *et al.*, 2017) [11] in a weed management study at Salem district. This might be due to the better assimilation of photosynthates because of the healthy vegetative phase and channelizing of assimilated photosynthates in to sink i.e., tuber (Mohamed Amanullah *et al.*, 2006) [7].

Table 1: Growth and yield and yield component traits cassava varieties at Thiruvavur district

S. No.	Parameters	H-226	Co (TP) 4	Local check (farmers practice)	Mean	SD	CV
1	Plant height (cm)	208.4	224.3	194.5	209.07	14.91	0.07
2	Number of primary branches /plant	3.3	3.8	2.9	3.33	0.45	0.14
3	Number of secondary branches /plant	5.5	5.7	4.5	5.23	0.64	0.12
4	Stem girth (cm)	8.2	8.8	7.3	8.10	0.75	0.09
5	Number of leaves	96.2	99.6	82.7	92.83	8.94	0.10
6	Number of tubers per plant	10.8	14.2	8.6	11.20	2.82	0.25
7	Length of tuber (cm)	28.3	32.5	22.5	27.77	5.02	0.18
8	Girth of tuber (cm)	14.9	15.6	13.4	14.63	1.12	0.08
9	Single tuber weight (gm)	262.3	274.6	224.2	253.70	26.28	0.10
10	Tuber yield / plant (kg)	7.2	8.1	5.6	6.97	1.27	0.18
11	Tuber yield (t/ha)	42.8	48.6	35.6	42.33	6.51	0.15
12	Starch content (%)	27.5	28.6	25.2	27.10	1.73	0.06

Table 2: Economics of cassava varieties at Thiruvavur district

Variety	Yield per ha (t/ha)	Gross Cost (Rs./ha)	Gross Income (Rs./ha)	Net Returns (Rs./ha)	B:C ratio
H-226	42.8	60000	171200	111200	2.8
Co (TP) 4	48.6	65000	194400	129400	3.0
Local check (farmers practice)	35.6	55000	142400	87400	2.6

Economics

The higher tuber yield had direct influence on better returns to the farmers. Among the three varieties highest net profit was obtained in Co (TP) 4 which is on par with the profit of H-226. Co (TP) 4 recorded the highest net profit of Rs. 129400/ha with the benefit to cost ratio of 3.0 followed by H-226 (Rs. 171200/-ha, 2.8) while the local check registered the least net profit of Rs. 142400/-ha and B:C ratio of 2.6. Through this assessment it was found that farmers were very much convinced with the performance of cassava variety Co (TP) 4 which was given higher income, higher yield and starch content when compared with H-226 and local adopted check varieties.

Conclusion

Based on the crop performance and net returns obtained, it is concluded that Co (TP) 4 and H-226 in Thiruvavur district were more beneficial under irrigated conditions when

compared to local check variety for Thiruvavur district of Tamil Nadu and suggested for large scale cultivation.

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