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Evaluation of improved varieties of cassava in the tribal belts of Attappadi in Kerala

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Abstract

Cassava is an important source of energy in the diet of the people of tropical countries in the world. It has enormous potential in India for food security and industrial uses due to its ability to grow in marginal and waste lands where other crops do not survive. Commercial planting of cassava is done from stem cuttings. Because of the low multiplication rate as compared to cereals and pulses, the high yielding varieties released in the research institute takes many years to reach the farmers. Over the years, clonal multiplication degenerates the planting material, reduce tuber yield drastically, and renders the cultivation of cassava uneconomical. An attempt was made to see the performance of improved varieties of cassava in Pudur gram Panchayat of Attappadi tribal region in Palakkad district which falls under Attappadi Hills laterites Agro Ecological Unit 18 (AEU18) of Kerala. The programme was implemented under the project on Development of Tuber Crops financed by Government of Kerala during 2014-15 and 2015-16 undertaken by ICAR-Central Tuber Crops Research Institute, Sreekariyam, Thiruvananthapuram, Kerala. Fifty farmers were selected and quality planting materials of improved varieties of cassava from ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI), Thiruvananthapuram, Kerala were distributed for cultivation in an area of 25 cents of each, with a total areaof 5 ha. The cultivation of cassava was carried out under rainfed conditions with the guidance and the direct supervision of ICAR-CTCRI scientists. Farmers got an average tuber yield of 3.40 kg to 6.50 kg per plant with an average number of tubers from 6 and 12 per plant in Pudur grama panchayat. Improved varieties of cassava produced significantly higher average tuber yield of 59.25t ha^{-1} at Pudur and the farmers also could produce 1.25 lakhs stems of cassava in one season sufficient for cultivation in an area of 80 ha. Adoption of improved varieties was economic with a B:C ratio of 2:1 which could improve their livelihood also, in addition to food security.

Keywords: Cassava, Quality planting material, B:C ratio, Tuber yield

Introduction

Cassava is the fourth most important source of calories in the human diet and has higher carbohydrate content than either maize or rice. Cassava was introduced into India from Brazil by the Portuguese, who landed in the Malabar region of Kerala in the 17th century. Cassava is one of the climate resilient tropical tuber crops used as food, feed and industrial raw material. In India, it is cultivated predominantly in Kerala and Tamil Nadu, and is also grown in Andhra Pradesh, Assam, Karnataka, Madhya Pradesh, Manipur, Nagaland, Tripura, Mizoram and the Andaman & Nicobar Islands. In coastal and

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tribal areas, it is a staple food. It is also the raw material for the starch and sago industry and a component of animal, fish and poultry feeds in many developing nations, including India (Joseph et al., 2004; Yan et al., 2013). In India, cassava is cultivated in an area of 0.183 million ha with a production of 6.94 million tonnes and the productivity in India is the highest (37.93 t ha^{-1}) globally (FAOSTAT, 2021). Tuber crops are rich sources of starch and hence apart from being a source of food, they find an important place in industrial sector as well. Root and tuber crops, most of them being vegetatively propagated,are inherently more prone to the incidence, continuity and dissemination of both systemic and non-systemic diseases than the sexually reproduced crops using true seed as planting material. Reduced availability of quality planting materials is a major hindrance in the faster spread of high yielding varieties and their adoption by the farming community.

Tuber crops are considered as insurance crops during the days of famine or natural calamity. It is an important source of energy for the millions of people in the tropical and subtropical parts of the world (Yan et al., 2013). It produces more calories per unit area per unit time than any other crop. Cassava is mainly grown for its starchy tubers of edible and commercial value. It is an important source of starch and a component of animal, fish and poultry feeds (Abraham et al., 2006; George et al., 2011). High yielding varieties released by research stations take several years to reach the end user because of the extremely low multiplication rate in tuber crops multiplication ratio in cassava to 1:10. Difficulty in transporting the planting materials to distant places due to bulkiness of planting material and the cassava mosaic disease infection are other major hindrancesto the spread of these crop in non-traditional areas of the country. Cassava, with its versatility to adapt to varying soil, climate and edaphic conditions, stand out as unique to meet the food and fuel requirements of ever-increasing population. The ability to yield reasonably well under changing climatic conditions makes it a future crop. The present study was carried out with the objective of assessing the performance of improved varieties of cassavafrom ICAR-Central Tuber Crops Research Institute *viz*., Sree Jaya, Sree Vijaya, Vellayani Hrashwa, Aniyoor, CTM-806, CTM-820, CTM-818 and CTM-815 in Palakkad district of Kerala in tribal belts of Attappadi region of Kerala along with the multiplication of planting materials of the same.

Material and Methods

Performances of improved varieties of cassava were studied at Pudur grama panchayat, Attappadi tribal region of Palakkad district under Attappady Hills Agro ecological unit 18 (AEU18) of Kerala. In this AEU area, the climate is tropical humid monsoon type to sub humid semi arid with a mean annual temperature of 24.3 to 27.6°C and rainfall ranging from 856 to 1482 mm. The soils of Attappadi hills are fertile, and near neutral to slightly alkaline clay soils rich in organic matter. The programme was implemented through Pudur Krishi Bhavan of Palakkad district of Kerala during 2014-15 and 2015-16 under the project on Development of Tuber Crops in the state of Kerala which was undertaken by ICAR-Central Tuber Crops Research Institute, Sreekariyam, Thiruvananthapuram, Kerala funded by the Department of Agriculture, Government of Kerala. The quality planting materials of eight improved varieties of cassava *viz*., Sree Jaya, Sree Vijaya, Vellayani Hrashwa, Aniyoor, CT- 806, CTM-820, CTM-818 and CTM-815 were distributed to the farmers for cultivation in an area of 25 cents per each beneficiary, and thus covering a total area of 5 ha. Five skill-based training programmes were conducted for fifty farmers on various topics, such as scientific cultivation practices, improved varieties, agro techniques, organic cultivation, plant protection measures, minisett quality planting material production (James George et al., 2004), seed treatment, value addition and seed certification standards. The experts of ICAR-CTCRI, Thiruvananthapuram visited the farmers field periodically and gave technical advice on intercultural operations, remedial measures for incidence of pest and disease, rouging of off types and disease infected plants. The yield data were recorded at the time of harvesting.

Result and Discussion

Based on random sampling, an average cassava tuber yield of 59.26 t ha^{-1} was recorded at Pudur area. The tuber yield varied from 3.20 to 6.50 kg per plant with an average of 4.80 kg per plant. Number of tubers ranged from 6 to 17 per plant with an average of 9.90 per plant (Table1 & Fig.1). The average tuber yield and planting material production per unit area of 25 cents were found to be 6,000 kg and 2500 stems, respectively.

In general, performance of improved varieties of cassava was better in AEU 18. Among the varieties, Sree Vijaya performed better in terms of tuber yield (7.5 kg $plant^{-1}$) and number of tubers (16 $plant^{-1}$) in Chavadiyoor village, followed by Vellayani Hrashwa (tuber yield - 6.4 kg $plant^{-1}$ and number of tuber - 15 $plant^{-1}$in Thekkuvatta village), Aniyoor (tuber yield - 5.8 kg $plant^{-1}$ and number of tuber -10 per plant in Chavadiyoor village). Among the different varieties, lower yield was recorded by Sree Jaya (3.20 kg $plant^{-1}$) in Thekkuvattu village. Earlier report revealed that the temperature variation prevailed during the cultivation might be the major reason for the lesser yield (Muthuraj et al., 2021). Taking into consideration, the cost of cassava stems, transportation,field preparation, planting and other cultivation expenses, total cost of cultivation was estimated as ₹ 20,000 for unit area of 25 cents. The planting materials and cultivations expenses

Table 1. Yield performance of cassava varieties in the farmer field at Pudur Panchayat of Attappadi region, Palakkad

Sl.No.	Name of the farmer	Name of the village	No of tubers plant^{-1}	Tuber yield (kg plant^{-1})	Variety
1.	Mr. C.Kaliappan	Chavadiyoor	10	5.300	Sree Vijaya
2.	Mr. R.Rajappan	Chavadiyoor	16	7.500	Sree Vijaya
3.	Mrs. Vadugi	Palagaiyoor	13	5.000	Vellayani Hrashwa
4.	Mr. T.Rangan	Chirakadavu	10	5.800	Aniyoor
5.	Mr. Kanagaraj	Chavadiyoor	13	5.900	Sree Vijaya
6.	Mr. K.Ravi	Chavadiyoor	11	3.500	Aniyoor
7.	Mr. R.Palanisamy	Thanchapadi	7	3.500	CTM-907
8.	Mrs. Mallika	Palagaiyoor	9	4.500	Sree Vijaya
9.	Mr. K.Eswaran	Padavayal	7	6.000	CTM-907
10.	Mr. G.Selvaraj	Palagaiyoor	7	4.400	CTM-907
11.	Mrs. Umamaheshwari	Chitra Kattavu	10	4.000	CTM-909
12.	P.Krishnakumar	Thekkuvatta	15	6.400	Vellayani Hrashwa
13.	M. Selvan	Chirakaduvu	12	6.500	Sree Vijaya
14.	Mr. Ponnan	Thekkuvatta	6	3.200	Sree Jaya
15.	Mr. Pradeep Kumar	Padavayal	10	5.500	CTM-817
16.	Mr. Sasikumar	Padavayal	12	5.100	Sree Vijaya
17.	Mr. Choriyan	Gottiyarkandi	11	4.800	Sree Jaya
18.	Mrs. Maheswari	Kolappadi	10	4.000	CTM-907
19.	Mr. Veeran	Melapalagaiyur	9	5.500	Sree Vijaya
20.	Mrs. Lakshmi	Vettiyoor	8	4.300	Sree Vijaya
		Total	198	96.000	
		Mean	9.90	4.800	

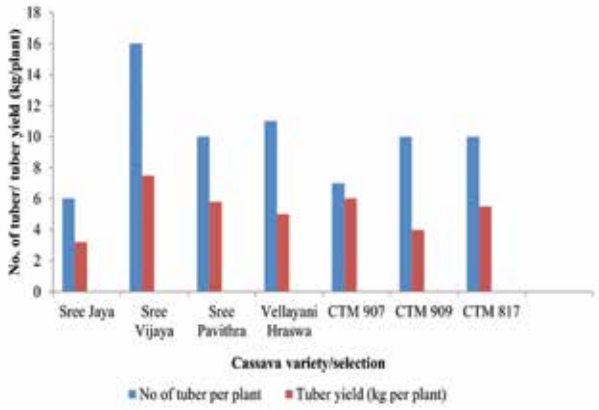

Fig. 1. Tuber number and tuber yield from different cassava varieties/selections at Pudur panchayat

were distributed to beneficiary farmers under the Development of tuber crops scheme. On an average, farmers got a tuber yield of 4.80 kg per plant at Pudur panchayat and 1.50 lakhs of cassava stems of improved varieties could be produced from 5 ha in one season. The planting materials produced under this programme were distributed to the neighbourhood farmers for cultivation in an area of 80 ha.

Table 2. Economics of cassava cultivation in the farmers field at Attappadi (0.25 acre)

Sl. No.	Item	
1	Cultivation expenses including cost of planting material (₹)	20,000
2	Tuber Yieldkg (0.25 acre)	6.0 t
3	Cross returns 20 per kg (₹)	60,000
4	Net return@ (₹)	40,000
5	B:C Ratio	2:1

Conclusion

The eight improved varieties of cassava from ICAR-CTCRI were given to tribal farmers in Attappadi in Palakkad district of Kerala and the crop was raised based on the ICAR-CTCRI package of practices on which training was given to the farmers.The results revealed that the average tuber yield was higher in Pudur (59.26 t ha^{-1}) as compared to local varieties (15.75 t ha^{-1}). Average tuber number was 9.9 plant^{-1} and average tuber yield was 4.80 kg per plant^{-1}. Accordingly, the net income and benefit-cost ratio from cassava crop from an area of 25 cents were ₹ 40,000 and 2:1 respectively was 2:1 in the

Pudur panchayat of Palakkad district of Kerala. Due to implementation of this programme, farmers of Pudur gram panchayat got sufficient good quality planting material of cassava available at the time of planting, and available locally. This helped to cover more area in Attappadi region with improved varieties of cassava and is fast spreading in the neighbourhood area and increased the income generation to farmers.

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