



Evaluation of High Yielding Turmeric Varieties for Alappuzha District

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ABSTRACT

Field experiments were conducted during 2018-19 and 2019-20 to assess the performance of high yielding turmeric varieties, IISR - Prathibha and Pragati in Onattukara region of Alappuzha district. The trials were conducted at 10 farmers' plots each during both the years and compared with traditionally cultivated local varieties. Observations on plant height, number of leaves, leaf length, leaf width, and number of clumps per plant were recorded in addition to the fresh and dried yield. The results showed that the plant height (135.3 cm), leaf length (61.3 cm), leaf width (15.8 cm) and number of clumps per plant (4.9) were higher in Prathibha variety compared to Pragati (109 cm; 51.25 cm; 12.9 cm; 3.25, respectively). IISR – Prathibha recorded the highest average yield of 20730 kg/ha followed by Pragati 20013 kg/ha compared to the farmers' variety (12728 kg/ha). It could be concluded that both Prathibha and Pragati were suitable varieties for large scale cultivation of turmeric in Onattukara region of Alappuzha district.

Key Words: Alappuzha, High Yielding, Onattukara, Prathibha, Pragati, Turmeric, Varieties.

INTRODUCTION

Turmeric (*Curcuma longa* L.) is one of the major spice crop grown in India. The major turmeric growing states in India are Andhra Pradesh, Tamil Nadu, Karnataka, Orissa and Kerala. In Kerala turmeric is grown in an area of 2778 ha with a production of 8822 t of cured turmeric (FIB, 2020). Among the 14 districts of Kerala, Alappuzha district occupies the second last position in area (49 ha) and last position in production (94 t of cured turmeric). Even though Alappuzha was known as the Venice of the East, mainly due to the export of spices through the sea port and turmeric variety Alleppey Supreme was famous for its qualities, the cultivation gradually came down due to various factors. Turmeric farmers of Alappuzha district face constraints like lack of high yielding varieties, low market price, and lack of processing facilities which results in poor returns from the crop in turn bringing down the enthusiasm among farmers. The fluctuating and uneconomic price of turmeric

fingers further make the farming activities non profitable. Against this background, an effort was made to find out high yielding varieties of turmeric suitable to the agro-ecological situation of the district which could enhance the productivity and make the farming profitable.

MATERIALS AND METHODS

Two high yielding varieties released from ICAR-IISR, Calicut was introduced and compared with the traditional local variety. These varieties were found to perform very good in different parts of the state. IISR-Prathibha is an open pollinated selection turmeric variety released in 1996. It has a duration of 225 day with an average production of 39.12 t/ha and the curcumin content of 6.52 per cent. IISR – Pragati is a germplasm selection by ICAR-IISR released in 2017. It has a duration of 180d with a yield of 38 t/ha and the curcumin content of 5.02 per cent. Field experiments were conducted for two crop seasons under rain fed conditions during 2018-

19 and 2019-20 by involving ten farmers each at Vallikunnam, Thamarakulam and Thazhakkara panchayaths. These panchayaths comes under the Agro Ecological Unit 3 (Onattukara sandy plains). The climate is tropical humid monsoon type with annual mean temperature of 27.6°C with a mean annual rainfall of 2492 cm. The soils are sandy, very deep and well drained with shallow water table.

The trials were carried out in RBD with 10 replications for two consecutive years. Each variety was grown in a uniform plot size of 80 m² in each replication. The primary rhizome (seeds) were planted in the beds of three meter length, one meter width and 20 cm height with a spacing of 25 x 25 cm. Farm yard manure (FYM) @ 25 t/ha and neem cake @ 500 kg/ha were applied at the time of bed preparation. NPK @ 60:50:120 kg/ha were applied in three splits during planting, 45 and 90d after planting and uniform cultivation practices were adopted as per ICAR-IISR (2015). Observations on plant height, number of leaves, leaf length, leaf width, and number of clumps per plant were recorded during October in both years. Fresh turmeric yield, dry yield and recovery percentage were recorded after harvesting and curing of the rhizomes. The data collected were statistically analysed using the WASP 1 tool available in the website of ICAR – CCARI, Goa (<https://ccari.res.in/waspnew.html>).

RESULTS AND DISCUSSION

The results indicated that both the high yielding varieties were significantly better compared to the local variety with regard to growth parameters like plant height, leaf length, leaf width and number of clumps per plant in trials conducted in 2018-19 and 2019-20 (Table 1). Plant height was higher for Prathibha variety (141.7 cm and 128.9 cm) with an average of 135.3 cm, followed by Pragati (114.6 cm and 103.4 cm) when compared to local turmeric variety (108.4 cm and 100.4 cm) in both years. The maximum leaf length was recorded in Prathibha (62.2 cm and 60.4 cm) in both years followed by Pragati (55.1 cm and 47.4 cm). Similar results were reported on plant height and leaf length by

Kandiannan *et al* (2015) and Kumar *et al* (2017). Prathibha recorded highest leaf width (16.4 cm and 15.1 cm) while both Pragati (13.7 cm and 12.1 cm) and local varieties (17.2 cm and 11.5 cm) had almost similar leaf widths. Clumps per plant were higher in Prathibha (6.3 and 3.4) compared to Pragati (3.77 and 2.88) and local variety (4.1 and 3.7) in 2018-19 and 2019-20. This observation was in agreement with Chaturvedi *et al* (2010) who reported that the varieties with shorter plants produced less tillers.

IISR – Prathibha recorded the highest average yield of 20730 kg/ha which is attributed to the plant height, and higher number of clumps per plant. This was followed by Pragati (20013 kg/ha) and local variety (12728 kg/ha). Kumar *et al* (2015) reported positive and significant association of rhizome yield with height of pseudo stem and number of tillers in turmeric. Prathibha recorded the highest cured turmeric yield of 3386 kg/ha which was highly superior with other varieties evaluated under the trial, Pragati (2683 kg/ha) and local (1722 kg/ha) (Table 2). Prathibha recorded the highest curing per cent of 16.48 per cent followed by local (13.48%) and Pragati (13.41%). The curing percentage depends on the genotype, duration, soil, nutrient management and agro-climatic conditions. Chaudhary *et al* (2006) reported that the increase in dry matter production in long duration genotypes might increase the curing percentage. Manan *et al* (2019) reported that in order to maximize the rhizome yield of turmeric, farmers must apply 25 per cent more quantity of phosphatic fertilizer than the recommendation along with use of mulching material @ 6 t/ha in sandy soils having low level of NPK.

In order to find out the economic feasibility of cultivating these varieties compared to the farmers practice (local varieties), economic indicators like cost of cultivation, net return and benefit cost ratio were worked out. It was found that the cost of production of high yielding varieties were higher in trials in both the years (Rs. 422648/ha) (Table 3). The additional cost incurred in the cultivation

Table 1. Biometric parameters of high yielding turmeric varieties introduced to Onattukara region

Variety	Plant ht. (cm)			Leaf length (cm)			Leaf width (cm)			Clumps/hill		
	2018-19	2019-20	Av.	2018-19	2019-20	Av.	2018-19	2019-20	Av.	2018-19	2019-20	Av.
Prathibha	141.7	128.9	135.3	62.2	60.4	61.3	16.4	15.1	15.75	6.3	3.4	4.85
Pragati	114.6	103.4	109	55.1	47.4	51.25	13.7	12.1	12.9	3.7	2.8	3.25
Local	108.4	100.4	104.4	52.1	47.4	49.75	17.2	11.5	14.35	4.1	3.7	3.9
CD (0.05)	8.3	20.4		3.6	9.2		2.5	1.7		2.8	NS	

Table 2. Yield and dry recovery of high yielding turmeric varieties introduced to Onattukara region

Variety	Fresh yield (kg/ha)			Cured turmeric yield (kg/ha)			Recovery %		
	2018-19	2019-20	Av.	2018-19	2019-20	Av.	2018-19	2019-20	Av.
Prathibha	21419	20040	20730	3348	3425	3386	15.66	17.3	16.48
Pragati	20568	19460	20013	2858	2508	2683	13.96	12.86	13.41
Local	13967	11490	12728	1744	1700	1722	12.44	14.53	13.48
CD (0.05)	4275	4990		607.8	697.3		1.07	2.24	

Table 3. Economic analysis of the cultivation of high yielding turmeric varieties in Onattukara region (Rs./ha)

Variety	Gross Cost			Gross Income			Net income			BCR		
	2018-19	2019-20	Av.	2018-19	2019-20	Av.	2018-19	2019-20	Av.	2018-19	2019-20	Average
Prathibha	412097	433200	422648	858760	801600	830180	446664	368400	407532	2.05	1.85	1.95
Pragati	412097	433200	422648	822744	778400	800572	410647	345200	377923	1.94	1.79	1.86
Local	386181	371200	378690	354175	459600	406887	15494	88400	51947	1.04	1.23	1.14

Rajeev and Muralidharan

of high yielding varieties was attributed to the cost of seed rhizomes, balanced fertilizer application, IPDM practices etc.

Prathibha recorded higher average net returns of Rs 407532/ha in comparison with Pragati (Rs.377923/ha) and local variety (Rs.51947/ha). This was due to the higher yield and recovery per cent over the local variety. The benefit cost ratio was also higher in high yielding varieties (Prathibha 1.95 and Pragati 1.86) compared to local farmer's variety (1.14). Lokesh and Chandraprakash (2003) also reported that the scientific method of turmeric cultivation increased the benefit cost ratio in high yielding varieties.

CONCLUSION

It could be concluded that the IISR – Prathibha and IISR – Pragati varieties were found to be promising and suitable varieties for Alappuzha district, Prathibha being superior. Target oriented training programmes, demonstrations and extension activities with making the seed rhizome available to the farmers could enhance the adoption of cultivation of these high yielding turmeric varieties in the district.

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