Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.2949

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (3):** 783-787 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Performance of Turmeric (*Curcuma longa* L.) Genotypes under Hill Zone (Zone-9) of Karnataka

Laxmi G. Kallur[1*], N. K. Hegde[2] and Shashidhar, M. D.[3]

College of Horticulture, Sirsi, (University of Horticultural Sciences, Bagalkot) Karnataka

*Corresponding Author E-mail: laxmihort95@gmail.com

Received: 4.05.2017 | Revised: 15.05.2017 | Accepted: 16.05.2017

ABSTRACT

Field trial on the evaluation of turmeric (Curcuma longa L.) genotypes for growth and yield was carried out during 2015-16 at College of Horticulture, Sirsi, Karnataka. The experiment was laid out in randomized block design with twenty-two treatments (varieties), replicated thrice. The turmeric genotypes were planted on raised bed of 3m × 1m following a spacing of 30cm × 20cm. Among the genotypes Suroma, Phule Swaroop, Prathibha and Cuddapah recorded higher plant height, number of tillers per plant, number of leaves per plant, leaf area and leaf area index. The var. Suroma registered the highest yield per plant (535.00 g), estimated fresh rhizome yield per hectare (67 t/ha) and curing percentage (22.05). The var. CO-1 and BSR-2 were found to be of long duration type while var. Kanti, Suvarna and Varna took 210 days in each to maturity. The var. Prathibha was found to be of short duration type (216.7 days) producing higher fresh rhizome yield (40.78 t/ha) under hill zone (Zone-9) of Karnataka.

Key words: *Turmeric, Genotype, Hill zone, Rhizome.*

INTRODUCTION

Turmeric (*Curcuma longa* L.) also called as Indian saffron or haldi is one of the most important and ancient spices of India. India has been recognized as world's largest producer, consumer and exporter of turmeric. In India, it is mainly grown in Tamil Nadu, Telangana, Andhra Pradesh, Assam, West Bengal, Orissa, Karnataka, Maharashtra, Bihar and Kerala. The national productivity of crop is 5.1 tons per hectare[2]. Belgaum, Chamarajnagara, Uttar Kannada, Hassan, Shimoga and Chickmagalore are important districts growing turmeric in Karnataka[1].

Uttara Kannada district (Karnataka) is topographically divided into three distinct zones/region: the narrow coastal line (Zone-10), the abruptly rising hills of the western ghats (Zone-9) and the flatter eastern portion (Zone-8) that merges with the Deccan plateau. Hill zone is characterized by high rainfall (2500 mm) with slopy land, light soils of lateritic origin and acidic pH (5.5-6.0). In this region turmeric is either grown as a pure crop or inter/mixed crop in coconut and arecanut plantations.

Cite this article: Kallur, L.G., Hegde, N.K. and Shashidhar, M.D., Performance of Turmeric (*Curcuma longa* L.) Genotypes under Hill Zone (Zone-9) of Karnataka, *Int. J. Pure App. Biosci.* **5(3):** 783-787 (2017). doi: http://dx.doi.org/10.18782/2320-7051.2949

Lack of suitable cultivar and package of practices for a particular agro-climatic conditions and cropping systems are reported to be the reasons for low productivity Veena[15].

Though wide genetic variability exists in turmeric with respect to the growth and yield, work on crop improvement through selection is inadequate[14]. With this background the present study was taken up to evaluate promising genotypes and released varieties of turmeric for rainfed cultivation under hill zone (Zone-9) of Karnataka.

MATERIAL AND METHODS

The experiment was carried out in the experimental plot of College of Horticulture, Sirsi, Uttar Kannada district, Karnataka, during 2015-16. Geographically Sirsi lies under hill zone (Zone−9) in the Agro climatic zone of Karnataka. It is situated at 14º 42.53' N latitude and 74º 41.58' E longitude and at an altitude of 637 m above the mean sea level. The investigation on performance of turmeric genotypes for growth and yield was laid out in Randomized Complete Block Design involving twenty-two genotypes replicated three times. Turmeric rhizomes were planted on raised beds of 3m × 2m size and rhizomes were spaced at 30cm × 20cm apart. Planting was done on 21st May 2015. Agronomic and plant protection measures were carried out as per standard practices. Observations on growth and yield attributes, curing percentage and crop duration were also recorded.

RESULTS AND DISCUSSION

Performance of different genotypes varied significantly with regard to plant height, number of tillers per plant, number of leaves per plant, leaf area and leaf area index (LAI) at all the stages of crop growth. Among growth parameters (Table-1) Plant height of var. Phule Swaroop (125.17 cm) and Suroma (119.0 cm) was statistically on par but significantly higher than the other varieties. These variations are attributed to variability in genetic makeup among turmeric genotypes when grown under hill zone (Zone-9) of Karnataka. Similar variations in these characters among the genotypes were reported by earlier workers in turmeric under different agroclimatic conditions[5] under Dharwad conditions, Gangadharappa *et al*[7]., under malnad conditions, Dhatt *et al*[6]., under Ludhiana conditions and Veena[15] under Mudigere conditions).

The var. Suroma, Phule Swaroop and Prathibha were found to be statistically on par with each other recording higher number of tillers per plant which resulted in higher number of leaves per plant. Anusuya[4] also indicated better tiller production in Suroma, Rajapuri and Bidar-1 when grown under different agro-climatic conditions of Karnataka. Veena[15] recorded maximum number of tillers in var. Kanti (5.83) followed by var. Suroma (5.60), Rajapuri (4.73) and genotype CLI-325 (4.63) under Mudigere conditions of Karnataka.

The maximum leaf area was recorded in the var. Suroma (5671.33 cm^2) which was on par with Prathibha (5240.00 cm^2), while minimum was in var. Sona (3715.11 cm^2). Leaf area index (LAI) is the measure of rate of photosynthesis. Higher LAI was registered in var. Suroma (9.45) and var. Prathibha (8.73) which can be attributed towards the higher number of leaves and leaf area among the two varieties. The results are in conformity with the findings of earlier workers in turmeric[4] under Arabhavi conditions, Veena[15] under Mudigere conditions, Kandiannan *et al*[10]. under Peruvannamuzhi, Kerala conditions and Shashidhar[13] under Arabhavi conditions.

A perusal of data presented in table-2 revealed that the var. CO-1 (265 days) and BSR-2 (256.7 days) were found to be of long duration type, while var. Kanti, Suvarna and Varna took minimum number of days to maturity (210 days each). Veena[15], reported from Mudigere conditions that turmeric var. Suguna (176 days) and Kedaram (180 days) were slightly early maturing types, while var. Kanti (245 days), Varna (245 days), Prabha (243 days) and Salem (240 days) were grouped as medium crop duration. Such variations were also reported by Hrideek *et al*[8]., and Anusuya[4] in turmeric cultivars grown under Western Ghats and Northern dry zone of Karnataka respectively.

The var. Suroma registered the highest fresh yield (41.67 t/ha) and curing percentage (22.05) among the evaluated 22 genotypes of

turmeric. The var. Prathibha (40.78 t/ha), Phule Swaroop (39.33 t/ha) and Cuddapah (37.76 t/ha) were found to be on par with var. Suroma recording higher estimated fresh rhizome yield. The maximum curing percentage was recorded in the var. Suroma (22.05) which was on par with var. Alleppey Supreme (21.20), CO-1 (21.00), Salem (20.67) and Phule Swaroop (20.50) and the minimum was in var. Krishna (16.42). Rao[12] and Aiyadurai[3] reported that variation in curing percentage was largely related to the genetic factors and environmental conditions under which they were grown and the similar variation in curing percentage was also reported by Pujari *et al*[11]., and Jadhao *et al*[9]. Present investigation is also in confirmity of these findings. Higher yield in var. Suroma, Phule Swaroop, Prathibha, and Cuddapah could be attributed to better growth and vigour of the genotypes. The growth is governed by the genetic composition of the genotype coupled with the environmental conditions under which the crop is grown. When different genotypes are grown under the identical conditions, it is the genetic makeup that expresses the morphological differences. Similar variation were observed in turmeric under different agroclimatic conditions of Karnataka[5] under Dharwad conditions, Gangadharappa *et al*[7]., under malnad conditions, Anusuya[4] under Arabhavi conditions and Veena[15] under Mudigere conditions.

Summary

Among the twenty-two genotypes evaluated Suroma, Phule Swaroop, Prathibha and Cuddapah recorded maximum plant height, number of tillers per plant, number of leaves per plant, leaf area, leaf area index and fresh rhizome yield. The var. Suroma recorded highest curing percentage. The var. CO-1 and BSR-2 were found to be of long duration type while, var. Kanti, Suvarna and Varna took minimum number of days to maturity. The var. Prathibha was found to be of short duration type, producing higher fresh rhizome yield. Thus it can be concluded that var. Suroma and Prathibha are significantly better than others in terms of growth and yield under hill zone (Zone-9) of Karnataka.

Table 1: Growth parameters in turmeric genotypes at 180 days after planting

Treatment	Genotype	Growth parameters				
		Plant height (cm)	Number of tillers per plant	Number of leaves per plant	Leaf area (cm^2)	Leaf area index
T_1	Alleppey Supreme	96.94	3.86	13.06	3916.44	6.53
T_2	Bidar Local	101.33	4.20	13.73	3753.56	6.26
T_3	BSR-2	103.83	5.10	14.63	4013.33	6.69
T_4	CO-1	105.20	4.50	15.40	4283.33	7.14
T_5	CO-2	101.96	4.26	15.53	4333.33	7.22
T_6	Cuddapah	108.07	4.75	16.88	4601.67	7.67
T_7	Erode Local	98.00	3.96	13.74	3980.00	6.63
T_8	Kanti	98.33	4.67	14.01	4150.00	6.92
T_9	Kedaram	98.33	4.70	13.33	4012.00	6.69
T_{10}	Krishna	100.92	4.88	16.00	4332.47	7.22
T_{11}	Phule Swaroop	125.17	5.36	18.30	4923.33	8.20
T_{12}	Prabha	97.61	4.29	14.08	4170.64	6.95
T_{13}	Prathibha	110.17	5.33	19.70	5240.00	8.73
T_{14}	Rajapuri	103.67	5.10	16.31	4535.33	7.56
T_{15}	Salem	107.71	4.73	15.91	4325.33	7.21
T_{16}	Sobha	98.13	3.74	14.17	4040.00	6.73
T_{17}	Sona	100.33	4.40	14.92	3715.11	6.19
T_{18}	Sudharsana	96.50	4.52	15.60	4223.33	7.04
T_{19}	Suroma	119.00	5.86	19.48	5671.33	9.45
T_{20}	Suvarna	101.00	4.70	16.50	4033.33	6.72
T_{21}	Tekurpet	97.00	4.88	15.80	4310.67	7.18
T_{22}	Varna	99.55	3.93	16.26	4004.02	6.67
	S. Em±	4.26	0.20	0.63	178.98	0.30
	C. D. at 5%	12.16	0.57	1.81	510.80	0.85
	CV (%)	7.16	7.51	7.02	7.21	7.16

Table 2: Fresh rhizome yield, curing percentage and crop duration in turmeric genotypes

Treatment	Genotype	Crop duration (days)	Yield per plant (kg)	Estimated fresh yield (t/ha)	Curing per cent
T_1	Alleppey Supreme	216.3	314.41	22.73	21.20
T_2	Bidar Local	223.0	221.65	17.66	18.25
T_3	BSR-2	256.7	380.81	24.04	19.47
T_4	CO-1	265.0	409.66	29.56	21.00
T_5	CO-2	241.3	351.15	28.38	17.76
T_6	Cuddapah	249.3	447.69	37.76	20.02
T_7	Erode Local	235.0	401.35	30.11	18.51
T_8	Kanti	210.0	283.42	18.67	19.09
T_9	Kedaram	213.3	244.11	18.02	18.07
T_{10}	Krishna	238.7	279.32	19.11	16.42
T_{11}	Phule Swaroop	245.0	515.55	39.33	20.50
T_{12}	Prabha	212.0	319.45	21.67	17.44
T_{13}	Prathibha	216.7	488.87	40.78	20.03
T_{14}	Rajapuri	235.7	403.93	27.33	19.40
T_{15}	Salem	231.3	437.61	31.67	20.67
T_{16}	Sobha	220.0	351.79	26.89	18.00
T_{17}	Sona	225.0	336.84	25.00	17.40
T_{18}	Sudharsana	220.0	302.93	19.80	16.75
T_{19}	Suroma	238.0	535.00	41.67	22.05
T_{20}	Suvarna	210.0	309.87	20.72	19.00
T_{21}	Tekurpet	232.0	422.06	30.78	20.09
T_{22}	Varna	210.0	301.53	20.00	18.10
	S. Em±	2.51	15.04	1.40	0.58
	C.D. at 5%	7.15	42.91	4.00	1.66
	CV (%)	1.89	7.11	9.04	5.28

REFERENCES

1. Anonymous, Indian Horticulture Database, National Horticulture Board (NHB), Gurgaon. pp. 17 (2013).
2. Anonymous, Indian Horticulture Database, National Horticulture Board (NHB), Gurgaon. pp. 6-7 (2014).
3. Aiyadurai, S.G., A review of research on spices and cashew in India. Indian Council of Agricultural Research (IARI), New Delhi. pp: 104-119 (1966).
4. Anusuya, Evaluation of different genotypes of turmeric for yield and quality under irrigated condition for command area of Northern Karnataka. *M.Sc. (Agri.) Thesis*, Univ. Agri. Sci., Dharwad (2004).
5. Cholke, S.M., Performance of turmeric (*Curcuma longa* L.) cultivars. *M.Sc. (Agri.) Thesis*, Univ. Agri. Sci., Dharwad (1993).
6. Dhatt, A.S., Sadhna, A., Neena, C., Sidhu, A.S. and Naveen, G., Evaluation of elite turmeric (*Curcuma longa* L.) clones for growth, yield and quality attributes. *Indian J. Agric. Sci.*, **78(7):** 589-591 (2008).
7. Gangadharappa, P.M., Hegde, H.G., Thammaiah, N. and Kanamadi, V.C., Performance of turmeric cultivars in Uttar Kannada district of Karnataka state. Advan. in Agri. Res. in India, **8:** 33-36 (1997).
8. Hrideek, T.K., Kuruvilla, K.M., Bindumol, G.P., Menon, P.P., Madhusoodanan, K.J. and Thomas, J., Performance evaluation of turmeric (*Curcuma longa* L.) varieties at higher elevation of Western Ghats. *J. Plantation Crops*, **34(3):** 178-180 (2006).
9. Jadhao, B.J., Mahorkar, V.K., Dalal, S.R. and Anjali, A.D., Effect of nutrient levels on yield and quality of turmeric varieties. *Int. J. Agri. Sci.*, **1(1):** 34-37 (2005).
10. Kandiannan, K., Anandaraj, M., Prasath, D., John Zachariah, T., Krishnamurthy, K. S. and Srinivasan, V., Evaluation of short and tall true turmeric (*Curcuma longa* L.) varieties for growth, yield and stability.

Indian J. Agril. Sci., **85(5):** 718-720 (2015).

11. Pujari, P.D., Patil, R.B. and Satpal, R.T., Studies on growth, yield and quality components in different turmeric varieties. *Indian Cocoa, Arecanut and Spice J*., **11(1):** 15-17 (1987).
12. Rao, V.T., Curing and processing of turmeric in Andhra Pradesh with special reference to Duggirala. *Spices Bull*. **4(1):** 91-95 (1965).
13. Shashidhar, M.D., Evaluation of turmeric genotypes and response of turmeric cv. Salem to seed rhizome treatment. *M.Sc. (Hort.) Thesis*, Univ. Hort. Sci., Bagalkot, Karnataka (2015).
14. Singh, S.P. and Prasad, R., Studies on varietal performance of turmeric (*Curcuma longa* L.). *Int. J. Plant Sci*., **1(1):** 22-23 (2006).
15. Veena, H., Performance of turmeric cultivars in hill zones of Karnataka. *M.Sc. (Hort.) Thesis*, Univ. Hort. Sci., Bagalkot, Karnataka (2012).