Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.2997

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (4):** 771-774 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Evaluation of Different Turmeric Genotypes for Yield and Yield Attributing Traits on the Basis of Mean Performance

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Received: 20.05.2017 | Revised: 29.05.2017 | Accepted: 30.05.2017

ABSTRACT

The present investigation was carried out at the experimental farm, Department of Horticulture, AKS University, Satna during 2014-15. The trials were laid out in randomized block design (RBD) with three replications using ten genotypes of turmeric. The traits analyzed were plant height (cm), length of leaf (cm), width of leaf (cm), number of leaves/plant, number of tillers/plant, number of mother rhizomes/plants, number of daughter rhizomes/plant, weight of mother rhizomes/plant (g), weight of daughter rhizomes per plant (g), weight of total rhizomes/plant (g), yield of cured rhizomes per plant (g), and harvest index (%). As per analysis of the data, Rajendra Sonia, Morangia, Vontimitta and Suvarna were found to be the most promising genotypes identified during this investigation.

Key words: *Rhizomes, Genotypes, Turmeric, Horticulture.*

INTRODUCTION

Turmeric (*Curcuma longa linn*) is one of the important spice crop of India and famous as golden spice in all over the world. Its best uses start from the birth to ends of the life of the human being. Over all a large number of its usage are prevelant. The turmeric plants were cultivated by Harappa civilization earlier in the 3000 B.C. India is a leading producer and exporter of turmeric in the world and India produces 50% turmeric of the world production[6]. The quality attributes of the commercial value of turmeric are its appearance, maturity, bulk density, length, thickness, intensity of colour and aroma.

Genetic variability is essential for initiating, effective and successful breeding programme for crop improvement. Wide ranges of genetic variability exist in turmeric with regard to the growth, yield and quality. The present investigation has been therefore, carried out with the relevant objective such as estimation of mean performance in the existing genotypes for yield and yield attributing traits.

MATERIALS AND METHODS

The present experiment entitled "Genetic variability in turmeric (*Curcuma longa linn*) was carried out at the experiment farm, Department of Horticulture, AKS University, Satna during 2014-15.

Cite this article: Mishra, P. and Singh, T., Evaluation of Different Turmeric Genotypes for Yield and Yield Attributing Traits on the Basis of Mean Performance, *Int. J. Pure App. Biosci.* **5(4):** 771-774 (2017). doi: http://dx.doi.org/10.18782/2320-7051.2997

The traits were laid out in randomized block design (RBD) with three replications using ten genotypes of turmeric *viz*. Rajendra Sonia, G.L. Puram-1, Kodur Chayapasupa, vontimitta, A.P.-317, Morangia, Mango-ginger, Suverna, Sugandham. Turmeric is always propagated vegetatively by fingers or rhizome with more than two buds with a spacing of 30cm×20cm and 5-7cm deep into the soil. Biometrical observations were recorded on five randomly selected plants for each replication on plant height (cm), length of leaf (cm), width of leaf (cm), number of leaves per plant, number of tillers per plant, number of mother rhizome per plant, number of daughter rhizome per plant, weight of mother rhizome per plant (g), weight of daughter rhizome per plant (g), weight of total rhizome per plant (g), yield of cured rhizome per plant (g), and harvest index (%). Besides in order to draw the valid conclusion data collected were analyzed statistically.

RESULTS AND DISCUSSION

An insight into the extent of variability present in the genetic stock is of prime importance which provides the best picture of genetic gain achievable through selection. Critical assessment of nature and magnitude of variation is the first and the foremost step in formulating an effective breeding programme. In quantitative characters, phenotype is an unreliable indicator of genotype and hence it is desirable to test the genotypic value of individuals prior to selection. Since the observed variability in the population is the sum total of variation arising due to genotypic and environmental effects, knowledge on the nature and magnitude of genetic variation contributing to gain under selection is essential[1]. Several research findings were available with respect to varietal variation in turmeric significant work among them include those of Babu *et al*[2]., for weight of mother and finger rhizome, number weight of primary fingers, Chattopadhyay *et al*[3]., for plant height and number of leaves/plant, Kandiannan *et al*[4]., for rhizome yield/plant, Maurya and Maurya[5] also reported variability for plant height, number of leaves/plant, number of tillers, rhizome yield and cumin content.

Plant height varies significantly among the turmeric genotypes, the maximum plant height was recorded in 'Rajendra sonia' (153.30cm) and it was closely followed by Suvarna (149.61cm), Vontimitta (141.60cm), G.L. Puram-1 (132.17cm) and AP-317 (128.83cm). Whereas, comparatively lower height was recorded in Mango-Ginger (114.55cm), Chayapasupa (118.62cm) and Kodur (125.33cm), The plant height of Rajendra Sonia was significantly superior over all the turmeric types except Survarna which is at par with each other. The general mean for this character was 44.01cm.

The length of leaf was maximum in AP-317 (68.78cm) which was followed by Suvarna (68.68cm), Vontimitta (67.09cm), Rajendra Sonia (64.68cm), G.L. Puram-1 (62.14cm) and Morangia (58.21cm). The minimum length of leaf was recorded in Mango – Ginger (43.5cm) which was very close to Chayapasupa (45.23cm) and Kodur (52.96cm). The variety AP-317 was statistically superior over all the varieties except Suvarna which is at par with each other. The general mean for this character was 19.32cm.

Maximum width of leaf was observed in variety 'Suvarna'(16.38cm) followed by Vontimitila (15.99cm), G.L. Puram-1 (15.72cm), AP-317 (15.61cm), Rajendra Sonia (13.97cm) and Kodur (13.72cm). Where the minimum width of leaf was recorded in variety Chayapasupa (12.15cm), where was close to Mango-Ginger (12.23cm) and Sugandam(13.03cm). The variety suvarna was significantly superior over all the other varieties except Vontimitta. G.L. Puram-1 AP-317, Rajendra Sonia and Kodur does not differ significantly but they were at par with each other. The general mean for this character was (4.74cm).

Maximum number of tillers per plant was observed in "Suvarna" (4.61) which was significantly superior over all the variety and followed by Rajendra Sonia (4.19), Morangia (3.96), Chayapasupa (3.58), G.L. Puram-1 (3.57) and Kodur (3.49). Where the minimum number of tillers per plant were observed in Mango- Ginger (3.10) which was close to

Sugandham (3.31) and Votimitta (3.34) the general mean for this character was 1.22.

The number of leaves per plant was found maximum in case of AP-317(20.22) which was significantly superior over all the other varieties and followed by Morangia (19.06) +, Sugandham (18.48), G.L. puram-1 (17.81), Rajendra Sonia (17.54), Vontimitta (15.80) and Chayapasupa (13.56). The minimum number of leaves per plant were observed in Mango-ginger which was close to kodur (11.21) and Suvarna (12.09) however the general mean for this character was 5.15.

AP-317 recorded highest number of mother rhizomes per plant (2.27) which was significantly superior over all the other variety and was followed by G.L. puram-1 (2.21), Vontimitta (2.15), Morangia (14.85) and Rajendra Sonia (1.80). The variety Sugandham recorded lowest number of mother rhizomes per plant (1.10) which was close to Mango-ginger (1.21) cand Kodur (1.28). The general mean for this character was 0.56.

A significant variation among different turmeric genotypes with regard to number of daughter rhizomes per plant. Highest number of daughter rhizomes per plant was observed in variety "Morangia" (23.81) followed by Suvarna (18.99). Rajendra Sonia (18.70), AP-317 (18.54). Whereas lowest number of daughter rhizomes per plant was recorded in Mango-ginger (3.46). The variety 'Morangia' is significantly superior over all the other varieties except Suvarna and Rajendra Sonia. Both Suvarna and Rajendra Sonia were at par. The general mean for this character was 5.27.

G.L. puram-1 recorded maximum weight of mother rhizomes per plant (111.69g) followed by Vontimitta (104.12g) and AP-317 (102.61g). Where the minimum weight of mother rhizomes per plant was recorded in case of Mango-ginger (51.26g) which was close to Sugandham (57.61g) and Kodur (64.46g). The weight of mother rhizomes per plant G.L. puram-1 was significantly superior over all the other variety except Vontimitta, which was at par to G.L. puram-1. The general mean for this character was 26.48g.

The maximum weight of daughter rhizomes per plant was recorded in Rajendra Sonia (334.83g) followed by Sugandham (334.66g) AP-317 (332.66g), Morangia (320.21g) and G.L. puram-1 (315.32g). Whereas, the minimum weight of daughter rhizomes per plant were obtained in Mango-ginger (87.02g) and that was close to Chayapasupa (131.75g). The variety Rajendra Sonia was significantly superior over all the other variety except Sugandham, which was at par with Rajendra Sonia. The general mean for this character was (87.13g).

Weight of total rhizomes per plant was maximum in AP-317 (560.36g) followed by Morangia (523.46g), Rajendra Sonia (487.21g), Sugandham (462.51g) Vontimitta (413.30g) and G.L. puram-1 (395.80g). Whereas the minimum weight of total rhizomes per plant was recorded in mango-ginger (127.00g). Which was close to Chayapasupa (186.11g). The variety AP-317 was found significantly superior over all the rest varieties except Morangia, Rajendra Sonia,Sugandham, Vontimitta and G.L.puram-1 which were at par. The general mean for this character was (126.59g).

Analysis of data revealed a significant variation among turmeric varieties with regard to yield of cured rhizome per plant. The yield of cured rhizome per plant was found to be maximum in the variety Rajendra Sonia (116.91g.) and it was closely followed by Sugandham (111.92 g), Morangia (104.02 g), Vontimitta (83.90 g), and Suvarna (79.73g). Where comparatively lower yield was recorded in the genotypes "Mango-ginger" (29.20 g). Chayapasupa (31.03 g) and Kodur (46.43 g). The variety Rajendra Sonia was found significantly superior over all the other variety except Sungandham and Morangia which were at par with each other. The general mean for this character was 25.24g.

The variety Rajendra Sonia (40.72%), Morangia (40.55%), GL Puram-1 (40.16%), Sugandham (38.92%) and Vontamitta (31.99%), whereas, the lowest harvest index (%) was reported in Mango-ginger (17.12%). The variety Rajendra Sonia, Morangia, GL Puram-1, Sugandham and Vontamitta did not differ significantly but were at par with each other. The general mean for this character was 10.26 %.

Table 1: mean performance of different turmeric genotypes for yield and other important characters

S.No.	Genotypes	Plant height (cm)	Length of leaf (cm)	Width of leaf (cm)	No. of tillers per plant	No. of leaves per plant	No. of mother rhizomes per plant	No. of daughter rhizomes per plant	Weight of mother rhizomes per plant (g)	Weight of daughter rhizomes per plant (g)	Weight of total rhizomes per plant	Yield of curd rhizome per plant	Harvest invest
1.	Suvarna	149.61	68.368	16.38	4.16	12.09	1.35	18.99	71.76	263.56	324.53	79.73	29.79
2.	Vontimitta	149.60	67.09	15.99	3.34	15.80	2.15	15.31	104.12	277.29	413.30	83.90	31.99
3.	Rajendra Sonia	153.30	64.21	13.97	4.19	17.54	1.80	18.70	81.51	334.83	487.21	116.91	40.72
4.	Morangia	128.83	58.21	13.50	3.96	19.06	1.85	23.81	80.07	320.21	523.46	104.02	40.55
5.	G.L.Purnam-1	132.17	62.14	15.72	3.57	17.81	2.21	13.07	111.69	315.32	395.80	79.48	40.16
6.	AP-317	128.83	68.78	15.61	3.45	20.22	2.27	18.54	102.61	332.66	560.36	74.58	23.72
7.	Sugandham	127.94	49.02	13.03	3.31	18.48	1.10	16.08	57.61	334.66	462.51	111.92	38.92
8.	Mango-ginger	114.55	43.5	12.23	3.10	8.58	1.21	3.76	51.26	87.02	127.00	29.20	17.12
9.	Chayapasupa	118.62	45.23	12.15	3.58	13.56	1.56	16.73	69.18	131.75	186.11	31.03	21.75
10	Kodur	125.33	52.96	13.72	3.49	11.21	1.28	13.12	64.46	216.53	317.36	46.43	23.14
Character Mean		44.01	19.32	4.74	1.22	5.15	5.27	0.56	87.13	26.48	126.59	25.24	10.26
S.Em.		0.95	0.77	0.10	0.06	0.207	0.033	0.253	0.808	1.544	2.783	0.710	0.239
CD at 5 % d.f.		2.80	2.39	0.28	0.18	0.62	0.75	0.09	4.58	2.40	8.27	2.11	0.71

CONCLUSION

The present investigation involves 10 turmeric accessions for analyzing variability for yield and yield attributing traits revealed significant variation among the accessions. Based on overall performance of the accessions Rajendra Sonia, Morangia, Vontimitta and Suvarna were found superior over the other genotypes. Hence use of these genotypes for improvement in turmeric may be recommended for the cultivation of turmeric for Vindhya region, However this investigation needs and it is subject to further investigation.

Acknowledgement

Authors are thankful to Er, Anant Soni Chairman AKS, University Satna for very kindly providing all the necessary experimental facilities time to time for successful conduct of the experiment.

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