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Selection parameters for curcumin, rhizome yield and its components in turmeric (*Curcuma longa* L.) under foot hills of Arunachal Pradesh

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Abstract

Fifty five diverse genotypes of turmeric collected from various parts of country were evaluated during 2010-11. Analysis of variance revealed significant differences among the genotypes for all the characters studied. High phenotypic and genotypic coefficient of variation, heritability (bs), genetic advance as percentage of mean were observed for weight of secondary rhizome per plant, average weight of secondary rhizome, curcumin content, rhizome yield per plant, average weight of primary rhizome, weight of primary rhizome per plant, number of mother rhizomes per plant, average weight of mother rhizome, number of secondary rhizomes per plant, weight of mother rhizome per plant and number of tillers per plant. Correlation studies revealed that rhizome yield per plant showed positive and significant correlation with weight of secondary rhizome per plant, weight of primary rhizome per plant, crop duration, average weight of secondary rhizome, number of tillers per plant, average weight of primary rhizome, leaf area, number of leaves per plant, weight of mother rhizome per plant, number of secondary rhizomes per plant, average weight of mother rhizome and number of mother rhizomes per plant at both genotypic and phenotypic level. Maximum positive direct effect on rhizome yield per plant was exerted by weight of secondary rhizome per plant followed by weight of primary and mother rhizomes per plant at both genotypic and phenotypic level indicating that selection based on these traits will be highly desirable. The genotypes *viz.,* CHFT-8, CHFT-61, CHFT-22 and CHFT-30 were found good for rhizome yield and Megha Turmeric-1, CHFT- 14, CHFT- 17 and CHFT-24 for curcumin content. The identified accessions could be considered for further improvement of yield.

Keyword: Variability, heritability, genetic advance, correlation, path analysis, selection, turmeric

Introduction

Turmeric (*Curcuma longa* L.), a rhizomatous herbaceous plant of the Zingiberaceae family, is usually used as a spice, cosmetic, coloring agent, flavourant and preservative, and also ascribed universally to its aromatic, stimulative and carminative properties; and is traded as a spice, dye, oleoresin and source of industrial starch (Singh *et al*. 2013, Anandaraj *et al*. 2014). It is an ancient spice and being used dates back nearly 4000 years to the Vedic culture in India as a culinary spice and dye, and had a wide range of spiritual significance of Hindu religion. It is third spices crop of India next to chilli and black pepper with an average annual production of 846.7 thousand tonnes from an area of 177.5 thousand hectares with a productivity of 4.7 tonnes per hectare (Spices Board, 2006). Among the North Eastern Hill region, Arunachal Pradesh occupies 427 hectare area, 1,631 tonnes production with productivity of 3.82 tonnes per hectare (Spices Board, 2006). Arunachal Pradesh has greater potential to increase the production in order to promote export, besides meeting the domestic requirement. However, despite continuous efforts at various levels, the turmeric productivity did not gain momentum in North Eastern part of India, Arunachal Pradesh in particular. This could be attributed to a number of limiting factors of which lack of superior high yielding cultivars with good quality resulting in tremendous reduction in its yield and quality. Although, there are many poor genotypes that are under cultivation in the region, but their performance is poor and inconsistent. Great variation in agro climatic condition within Arunachal Pradesh necessitated the research works to evaluate and develop varieties suitable for existing environmental conditions. Since, more emphasis

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should be given for the collection, conservation and evaluation of germplasm of this crop to evolve elite variety with high yield potential and superior quality. Johnson *et al.* (1955a) reported that heritability and genetic advance, when computed together, are more useful in predicting the resultant effect of selection. The study of correlation of character will help in simultaneous selection for more than one character. Path coefficient analysis helps for sorting out the total correlations into direct and indirect effects and useful in selecting high yielding genotypes available. Keeping in view, the importance of above biometrical approaches and realizing the imperative need of such a study; the present investigation was planned to evaluate fifty five diverse genotypes of turmeric with objectives to evaluate variability in turmeric accessions for various horticultural characters and bioactive components which can serve as an index to select genotypes for improved nutritional properties, increased production and better gains.

Materials and Methods

The present investigation was carried out during summer 2010-11 at the Vegetable research farm, College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh. The Vegetable research farm is situated in the foot hills of Eastern Himalayan range at an altitude of 153 m above mean sea level, 28^0 04´ N latitude and 95^0 22 ´ East longitudes. The climate of this area is humid - sub tropical. The monsoon starts in the month of June and often remains active up to September. But pre-monsoon rain starts from the month of May and post-monsoon rain prevail up to October. The experimental material of present investigation was comprised of 55 diverse genotypes of turmeric received from different part of the North Eastern Hill region. The experiment was laid out in Randomized Block Design with three replications. The turmeric seed rhizomes were planted in 3.0 m × 1.0 m plots with row to row spacing 30 cm and plant to plant 25 cm in a row. The field was prepared by one deep ploughing, three harrowing followed by clod breaking, hoeing and levelling. Planting was done by using whole rhizome at the depth of 5 cm. The recommended dose of fertilizer for this region *i.e.* 120 kg nitrogen, 80 kg phosphorus and 120 kg potassium per hectare was applied. Half dose of nitrogen and full dose of phosphorus and potash were applied as basal dose and remaining dose of nitrogen was applied at the 45, 75 and 110 days after planting of rhizomes. The cultural operation like weeding, hoeing, irrigation and plant protection measures were done as per standard package of practices for turmeric cultivation. Five plants were randomly selected from each genotype and tagged. These plants were used for recording observations for days to 50% plant emergence, plant height (cm), pseudostem girth (cm), number of tillers per plant, number of leaves per plant, leaf area (cm^2), crop duration (days), number of mother rhizomes per plant, weight of mother rhizome per plant (g), average weight of mother rhizome (g), number of primary rhizomes per plant, weight of primary rhizome per plant (g), average weight of primary rhizome (g), number of secondary rhizomes per plant, weight of secondary rhizome per plant (g), average weight of secondary rhizome (g), rhizome yield per plant (g), dry matter content (%) and curcumin content (%). Genotypic and phenotypic coefficients of variation, heritability (bs) and genetic advance were estimated using the formulae suggested by Burton and de Vane (1953), Johnson *et al.* (1955a) and Singh and Chaudhary (1985). The correlation coefficients among all possible character combination at phenotypic (rp) and genotypic (rg) level were estimated by employing formulae of Al-Jibouri *et al*. (1958) and the path coefficient analysis of component traits with rhizome yield per plant was as per formulae suggested by Dewey and Lu (1959) and curcumin content was calculated as per procedure described by Manjunath *et al*. (1991).

Results and Discussion

Analysis of variance showed that the difference due to genotypes was significant for all the characters studied (Table1). The genotypes viz., CHFT-8, CHFT- 14, CHFT- 17, CHFT-22, CHFT-24, CHFT-30, CHFT-36, CHFT-61 and Megha Turmeric-1 were promising as they have more than one desirable character. These genotypes could be amply exploited in rhizome and curcumin yield improvement programme. The phenotypic and genotypic coefficients of variation (PCV and GCV), heritability and genetic advance as percent of mean were workout to various characters (Table 2). The results showed phenotypic coefficient of variation (PCV) was higher in magnitude than the genotypic coefficient of variation (GCV) in respect to all the characters. The characters *viz.,* weight of secondary rhizome per plant, average weight of secondary rhizome, curcumin content, rhizome yield per plant, average weight of primary rhizome, weight of primary rhizome per plant, number of mother rhizomes per plant, average weight of mother rhizome, number of secondary rhizomes per plant, weight of mother rhizome per plant and number of tillers per plant showed high PCV and GCV. Variability present in experimental materials indicated that there is possibility of obtaining high selection response for these characters. Similar results were also reported by Singh and Ramakrishna (2014) for rhizome yield, curcumin content, leaf length and

Table 1: Analysis of variance for different characters in turmeric genotypes

S. No.	Source of variation	Mean square		
		Replication	Genotype	Error
	df	2	54	108
1.	Days to 50% plant emergence	1.770	37.706**	3.269
2.	Plant height	9.629	438.400**	30.511
3.	Pseudostem girth	0.0577	0.346**	0.054
4.	Number of tillers plant	0.013	0.879**	0.104
5.	Number of leaves per plant	0.018	2.391**	0.373
6.	Leaf area	816.606	11238.283**	1218.261
7.	Crop duration	47.297	202.684**	49.723
8.	Number of mother rhizomes/ plant	0.003	0.598**	0.032
9.	Weight of mother rhizome/ plant	12.370	269.144**	18.382
10.	Average weight of mother rhizome	2.832	135.508**	3.905
11.	Number of primary rhizomes/ plant	0.043	2.170**	0.116
12.	Weight of primary rhizome/ plant	4.697	2170.581**	56.370
13.	Average weight of primary rhizome	0.409	91.964**	0.757
14.	Number of secondary rhizomes/ plant	0.597	17.973**	0.358
15.	Weight of secondary rhizome/ plant	49.170	4309.161**	41.922
16.	Average weight of secondary rhizome	0.063	43.064**	0159
17.	Dry recovery	1.231	5.895**	0.883
18.	Curcumin content	0.015	5.881**	0.029
19.	Rhizome yield per plant	154.297	12255.876**	100.427

** Significant at 1 %.

maturity, Prajapati *et al.* (2014) for weight of secondary rhizome per plant, weight of mother rhizome per plant, weight of primary rhizome per plant; Singh *et al.* (2008) for rhizome yield per plant; Sinkar *et al.* (2005) for curcumin content and Pandey *et al.* (2002) for number of tillers per plant. The estimates of heritability (bs) coupled with genetic advance as per cent of mean ( ) were high for average weight of secondary rhizome, curcumin content, rhizome yield per plant, average weight of primary rhizome, weight of secondary rhizome per plant, number of secondary rhizomes per plant, weight of primary rhizome per plant, average weight of mother rhizome, number of mother and primary rhizomes per plant, weight of mother rhizome per plant, plant height and number of tillers per plant suggested role of additive genes in the expression of these character which could be effectively improved upon selection. High heritability was also recorded by Prajapati *et al.* (2014) for rhizome yield per plant; Chattopadhyay *et al.* (2004) for weight of secondary rhizomes, number of secondary rhizomes, plant height and rhizome yield per plant; Singh *et al.* (2003) for number of leaves; Shanmugasundaram *et al.* (2000) for leaf area, weight of mother and primary rhizomes and Lynrah *et al.* (1998) for curcumin content and tillers per clump. The characters like weight of secondary rhizome per plant, average weight of secondary rhizome, curcumin content, rhizome yield per plant, average weight of primary rhizome, weight of primary rhizome per plant, number of mother rhizomes per plant, average weight of mother rhizome, number of secondary rhizomes per plant, weight of mother rhizome per plant and number of tillers per plant had high genotypic coefficients of variation coupled with high heritability suggested that there is enough scope for selection. Association of yield and its component assumes special importance as the basis for indirect selection. Genetic correlation between different characters of plant often arises because of linkage or pleiotrophy (Harland, 1939). Phenotypic correlation include a part of genotypic correlation and a portion of environmental correlation corresponding to the heritable portion of variation in two characters, it is expected that for highly heritable characters, genotypic correlations would be higher than phenotypic correlation, when the correlations are in the same direction. Phenotypic correlation can exceed genotypic correlation only if heritability of the two characters are low and there is a higher environmental correlation (Falconer, 1981).Phenotypic correlation exceed to genotypic correlations for twenty three character combinations *viz.,* rhizome yield per plant with number of primary and secondary rhizomes per plant; days to 50% plant emergence with number of leaves per plant; plant height with pseudostem girth, number of tillers per plant, number of leaves per plant and leaf area; pseudostem girth for number of tillers per plant, number of leaves per plant, leaf area, number of mother rhizomes per plant and weight of mother rhizome per plant; number of tillers per plant with number of leaves per plant and number of primary rhizomes per plant; number of leaves per plant with average weight of mother rhizome and number of primary rhizomes per plant; crop duration with dry recovery; number of mother rhizomes per plant with weight of mother rhizome per plant; weight of mother rhizome per plant with dry recovery; average weight of mother rhizome with number of secondary rhizomes per plant; number of primary rhizomes per plant with weight of primary rhizome per plant; number of secondary rhizomes per plant with weight of secondary rhizome per plant and weight of secondary rhizome per plant with dry recovery as due to high environmental correlation though heritability have high estimates for these character. Rhizome yield per plant showed positive and significant correlation with weight of secondary rhizome per plant, weight of primary rhizome per plant, crop duration, average weight of secondary rhizome, number of tillers per plant, average

Table 2: Mean performance of turmeric genotypes for yield and yield attributing characters

S N	Characters / Genotypes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1.	**CHFT-1**	32.33	90.33	3.31	2.67	9.40	723.75	206.67	1.47	40.33	27.50	5.13	78.33	15.25	12.87	77.67	6.03	196.33	7.85	26.18	18.50	4.53
2.	**CHFT-1-1**	33.67	91.60	3.60	2.93	9.47	617.51	196.67	1.20	42.67	36.67	3.93	72.67	18.47	7.60	64.67	8.50	180.00	7.17	23.89	19.51	4.04
3.	**CHFT-2**	31.67	95.27	2.99	2.20	8.47	628.52	188.33	1.27	33.00	26.33	5.60	78.67	14.05	11.60	59.33	5.11	171.00	6.84	22.81	19.36	5.75
4.	**CHFT-3**	31.00	106.70	4.04	1.73	8.33	562.45	186.67	1.20	32.33	26.88	4.47	50.00	11.25	9.07	37.00	4.07	119.33	4.64	15.47	18.21	4.45
5.	**CHFT-4**	31.33	119.47	4.02	1.93	9.00	671.16	183.33	1.20	32.00	26.67	6.20	72.33	11.66	10.87	44.33	4.08	148.67	6.00	20.00	20.17	4.52
6.	**CHFT-5**	33.33	128.67	4.34	2.07	8.20	624.52	185.33	1.20	35.67	29.91	5.67	74.00	13.06	10.00	46.00	4.58	155.67	6.23	20.75	21.34	3.07
7.	**CHFT-6**	31.00	120.53	3.81	1.80	9.53	651.35	191.33	1.27	37.33	30.22	5.13	70.33	13.67	11.00	64.33	5.85	172.00	6.88	22.93	19.67	4.94
8.	**CHFT-7**	34.00	107.07	3.51	2.60	8.53	628.04	184.67	1.53	42.67	27.94	4.13	60.00	14.48	10.53	77.33	7.34	180.00	7.20	24.00	18.38	4.25
9.	**CHFT-8**	29.00	98.33	3.77	3.40	10.87	793.28	203.33	1.27	34.33	27.64	5.73	153.33	26.77	10.87	231.00	21.26	418.67	16.75	55.82	19.24	4.00
10.	**CHFT-9**	33.33	114.33	3.61	2.53	9.20	638.19	182.00	1.53	39.00	25.42	4.27	78.67	18.41	8.00	67.67	8.45	185.33	7.41	24.71	19.07	5.71
11.	**CHFT-10**	41.67	98.80	3.28	3.13	10.33	736.45	196.67	1.87	35.00	18.79	4.27	110.67	25.95	8.87	115.67	13.05	261.33	10.45	34.84	16.04	3.59
12.	**CHFT-11**	38.67	102.27	3.17	2.33	9.67	684.03	188.67	2.67	46.00	17.22	4.13	82.67	20.00	7.67	67.33	8.77	196.00	7.84	26.13	21.04	2.83
13.	**CHFT-12**	33.00	103.07	3.35	2.40	9.40	661.92	198.33	2.07	27.67	13.38	4.40	62.00	14.11	9.47	55.67	5.87	145.33	5.81	19.38	17.89	4.53
14.	**CHFT-13**	36.33	104.07	3.36	2.07	10.07	606.16	185.33	1.87	42.33	22.70	5.53	60.33	10.87	8.33	38.67	4.61	141.33	5.65	18.84	19.42	4.61
15.	**CHFT-13-1**	37.00	101.67	3.18	2.47	9.20	550.05	182.67	1.47	32.00	21.94	4.20	57.33	13.57	5.73	37.33	6.49	126.67	5.02	16.73	19.21	4.03
16.	**CHFT-14**	34.67	107.00	3.55	2.13	9.73	589.89	182.00	2.00	22.33	11.17	4.47	41.00	9.17	8.67	50.00	5.77	113.33	4.53	15.11	20.32	5.92
17.	**CHFT-15**	36.33	116.00	3.57	2.20	9.40	614.69	199.67	1.60	38.33	23.96	4.40	58.33	13.23	9.67	32.00	3.30	128.67	5.15	17.15	18.94	2.57
18.	**CHFT-16**	30.00	111.00	3.99	1.60	10.00	576.19	181.67	1.53	28.00	18.31	4.27	46.00	10.73	7.60	30.00	3.93	104.00	4.16	13.87	20.91	4.99
19.	**CHFT-17**	40.00	95.87	2.97	2.20	10.53	585.60	192.00	1.47	25.33	17.36	3.33	55.67	16.82	7.13	63.00	8.82	144.00	5.76	19.20	16.40	6.57
20.	**CHFT-18**	35.00	102.60	3.43	2.53	10.00	690.57	191.33	2.07	41.67	20.11	4.80	99.67	20.80	9.00	62.00	6.88	203.33	8.13	27.11	20.16	2.65
21.	**CHFT-19**	38.00	105.80	3.46	1.93	9.60	626.09	190.00	1.33	32.67	24.72	4.27	97.00	22.73	6.27	57.67	9.19	187.33	7.20	24.00	20.31	3.09
22.	**CHFT-20**	34.33	93.33	2.98	2.67	10.47	737.60	205.00	2.13	46.00	21.55	4.60	135.33	29.47	8.33	62.00	7.44	243.33	9.74	32.45	20.81	2.47
23.	**CHFT-21**	31.00	111.40	3.38	2.53	10.47	697.09	196.67	2.07	44.67	21.61	5.27	103.33	19.64	9.33	66.67	7.14	214.67	8.59	28.62	21.44	2.55
24.	**CHFT-22**	31.00	110.33	3.75	3.20	11.33	744.95	200.00	2.33	42.00	18.02	5.33	114.00	21.37	14.20	149.33	10.52	305.33	12.19	40.62	20.22	2.34
25.	**CHFT-24**	34.67	100.53	2.93	2.27	10.00	615.10	184.00	1.87	34.67	18.67	4.87	74.67	15.33	6.67	42.00	6.29	151.33	6.08	20.26	20.26	6.37
26.	**CHFT-25**	36.33	126.33	4.22	1.60	9.93	679.80	185.33	1.40	38.00	27.30	5.40	84.00	15.54	10.20	43.33	4.24	165.33	6.61	22.04	19.92	4.95
27.	**CHFT-26**	30.00	100.80	3.58	3.27	10.07	701.16	200.00	3.00	62.67	20.89	4.80	91.33	19.00	12.07	87.33	7.23	241.33	9.65	32.17	20.62	2.19
28.	**CHFT-27**	36.00	117.93	3.48	2.27	9.53	679.03	180.33	1.73	34.00	19.63	4.67	57.33	12.24	7.73	51.33	6.62	142.67	5.71	19.02	21.19	5.81
29.	**CHFT-28**	36.00	106.13	3.47	2.47	10.33	648.59	183.33	1.73	30.00	17.33	4.13	60.67	14.67	8.53	50.00	5.86	140.67	5.63	18.75	18.82	4.63
30.	**CHFT-29**	34.67	104.47	3.21	2.13	9.53	695.56	184.00	1.47	34.00	23.15	4.53	62.67	13.80	9.07	47.33	5.22	144.00	5.76	19.20	19.64	2.32
31.	**CHFT-30**	31.00	116.67	4.05	3.53	10.67	850.11	194.67	1.87	51.67	27.79	7.60	125.33	16.48	16.73	128.33	7.67	305.33	12.21	40.71	17.85	1.95
32.	**CHFT-31**	34.00	121.20	4.21	1.93	10.00	669.63	184.67	1.93	40.67	21.00	4.87	67.67	13.87	9.47	56.33	5.94	164.67	6.59	21.95	19.84	4.55
33.	**CHFT-32**	30.67	119.40	3.57	2.53	10.67	732.89	206.67	2.93	69.67	23.77	6.20	91.33	14.70	15.93	77.33	4.85	238.33	9.52	31.73	18.37	2.08
34.	**CHFT-33**	31.33	100.47	3.43	2.20	10.13	620.72	183.33	1.93	40.00	20.65	4.80	64.67	13.45	8.20	17.33	2.11	122.00	4.88	16.27	16.69	5.38
35.	**CHFT-34**	32.33	119.07	3.58	2.13	9.53	690.72	187.33	1.13	35.33	31.22	4.87	58.00	11.93	6.93	49.33	7.10	142.67	5.71	19.02	17.70	1.72
36.	**CHFT-36**	31.33	108.00	3.21	2.73	10.40	700.59	204.67	1.40	58.00	41.43	5.27	167.67	31.84	5.53	65.67	11.86	291.33	11.66	38.85	20.08	3.67
37.	**CHFT-37**	31.00	98.93	3.21	3.00	10.80	718.40	200.67	1.53	51.33	33.51	6.03	93.33	15.47	11.67	112.67	9.65	257.33	10.29	34.31	20.64	4.90
38.	**CHFT-38**	34.00	114.73	3.42	2.47	10.40	692.16	193.33	1.07	34.67	32.56	4.40	88.00	20.00	8.40	80.67	9.59	203.33	8.10	27.00	20.32	3.95
39.	**CHFT-39**	31.67	73.13	3.18	2.27	10.33	604.77	192.00	2.07	47.33	22.85	5.87	99.33	16.93	12.93	65.33	5.04	212.00	8.37	27.89	20.65	1.57
40.	**CHFT-40**	34.00	100.67	3.35	2.20	9.40	639.41	182.67	1.20	48.67	40.56	4.07	64.67	15.87	9.13	63.33	6.93	176.67	6.99	23.29	18.14	2.42
41.	**CHFT-41**	33.33	105.07	3.48	1.87	9.33	588.59	179.67	1.13	32.00	28.33	5.47	68.67	12.53	10.13	44.00	4.33	144.67	5.73	19.11	20.52	4.28
42.	**CHFT-42**	33.00	94.47	3.35	2.47	10.27	597.60	184.00	1.87	41.33	22.07	5.60	68.00	12.15	10.00	60.67	6.04	170.00	6.70	22.33	16.79	3.97
43.	**CHFT-43**	35.67	89.40	3.27	2.07	9.93	583.37	183.33	1.00	29.33	29.33	7.07	67.33	9.53	8.67	62.00	7.15	158.67	6.17	20.55	19.76	4.13
44.	**CHFT-44**	32.67	94.07	3.08	2.67	10.93	701.75	194.00	1.80	44.00	24.40	5.20	104.00	19.96	16.13	84.00	5.21	232.00	9.15	30.49	17.93	5.62
45.	**CHFT-47**	31.00	95.67	3.38	3.00	11.47	669.85	203.33	1.47	62.67	42.80	5.33	98.00	18.36	11.53	112.00	9.70	272.67	10.50	35.00	17.91	4.49
46.	**CHFT-51**	41.33	112.53	3.66	2.47	10.27	586.77	185.33	1.93	42.67	21.96	5.83	67.33	11.54	8.73	56.00	6.39	166.00	6.61	22.03	16.81	5.43
47.	**CHFT-52**	42.00	103.47	3.29	2.87	9.80	642.83	186.67	1.27	44.00	34.68	6.33	73.67	11.60	12.20	70.00	5.73	187.67	7.41	24.69	20.60	4.32
48.	**CHFT-61**	31.00	106.93	3.46	3.13	11.93	750.85	201.33	1.87	46.67	25.00	5.00	153.33	30.63	9.87	168.00	17.05	368.00	14.40	48.00	20.40	1.27
49.	**RH-9/90**	31.67	80.77	3.44	3.33	10.33	665.04	193.33	1.80	54.33	30.19	4.20	79.67	18.96	8.93	85.33	9.55	219.33	8.77	29.24	20.84	5.70
50.	**RH-13/90**	36.33	89.27	4.34	3.60	12.27	684.16	203.33	1.27	37.33	29.52	4.47	102.00	22.82	8.20	106.67	13.05	246.00	9.84	32.80	19.17	5.15
51.	**RH-50**	31.33	82.61	3.54	4.00	12.07	606.75	196.67	1.20	42.67	35.56	4.20	104.00	24.77	8.20	90.67	11.05	237.33	9.49	31.64	21.93	5.65
52.	**RH-80**	42.67	86.69	3.13	3.27	11.67	665.33	206.67	1.60	30.67	19.26	3.53	100.33	28.53	8.07	157.00	19.49	288.00	11.52	38.40	19.32	5.03
53.	**TCP-70**	38.00	80.27	3.40	3.13	10.73	570.08	189.33	1.13	32.00	28.22	3.93	78.33	20.11	8.80	74.67	8.48	185.00	7.39	24.62	21.27	4.59
54.	**TCP-129**	33.00	87.40	3.62	3.00	10.53	582.40	188.67	1.87	43.33	23.19	4.13	79.00	19.11	7.00	60.67	8.67	183.00	7.31	24.35	20.78	4.80
55.	**Megha Turmeric-1**	44.00	97.40	3.54	2.87	11.40	636.57	203.33	1.27	40.67	32.14	4.17	93.33	22.38	7.00	101.33	14.49	235.33	9.41	31.37	19.76	7.28
	Mean	**34.25**	**103.09**	**3.50**	**2.55**	**10.11**	**656.56**	**191.72**	**1.64**	**40.14**	**25.54**	**4.92**	**83.62**	**17.27**	**9.55**	**73.22**	**7.81**	**196.99**	**7.84**	**26.14**	**19.47**	**4.15**
	C.V. (%)	**5.27**	**5.35**	**6.67**	**12.66**	**6.04**	**5.31**	**3.67**	**10.89**	**10.68**	**7.73**	**6.93**	**8.97**	**5.04**	**6.26**	**8.84**	**5.10**	**5.08**	**10.93**	**10.93**	**4.82**	**4.15**
	C.D. at 5%	**2.92**	**8.93**	**0.37**	**0.52**	**0.98**	**56.48**	**11.41**	**0.28**	**6.93**	**3.19**	**0.55**	**12.15**	**1.40**	**0.96**	**10.47**	**0.64**	**16.21**	**1.39**	**4.62**	**1.52**	**0.27**

1.Days to 50% plant emergence, 2. Plant height (cm), 3. Pseudostem girth (cm), 4. Number of tillers per plant, 5. Number of leaves per plant, 6. Leaf area (cm^2), 7. Crop duration (days), 8. Number of mother rhizomes per plant, 9. Weight of mother rhizome per plant (g), 10. Average weight of mother rhizome (g), 11. Number of primary rhizomes per plant, 12. Weight of primary rhizome per plant (g), 13. Average weight of primary rhizome (g), 14. Number of secondary rhizomes per plant, 15.Weight of secondary rhizome per plant (g), 16. Average weight of secondary rhizome (g), 17. Rhizome yield (g/plant), 18. Yield (kg/ $3m^2$), 19. Yield (t/ha). 20. Dry recovery (%) and 21. Curcumin content (%).

weight of primary rhizome, leaf area, number of leaves per plant, weight of mother rhizome per plant, number of secondary rhizomes per plant, average weight of mother rhizome and number of mother rhizomes per plant both at genotypic and phenotypic level. This indicated that selection for these traits could be effective to improve rhizome yield per plant in turmeric. These results were in conformity of plant Bahadur *et al.* (2016) for number of leaves per plant and number of tillers per plant; Prajapati *et al.* (2014) for weight of primary rhizome per plant and weight of secondary rhizome per plant; Kumar *et al.* (2006) for weight of mother rhizomes and Yadav *et al.* (2006) for number of primary and secondary rhizomes per plant, weight of primary and secondary rhizomes per plant. Since, weight of secondary rhizome per plant emerged as most important associates of rhizome yield per plant, its significant positive association with average weight of secondary rhizome, weight of primary rhizome per plant, number of tillers per plant, average weight of primary rhizome, leaf area, number of leaves per plant, crop duration, number of secondary rhizomes per plant, weight of mother rhizome per plant and average weight of mother rhizome indicated that direct selection for these traits can increase weight of secondary rhizome per plant thereby ultimately improves the rhizome yield per plant.

Rhizome yield per plant had negative and significant correlation with plant height, days to 50% plant emergence and curcumin content both at genotypic and phenotypic level indicated that rhizome yield and curcumin content could not be improved simultaneously through selection. So, independent selection for these traits could be made to get improved population. Present result was in conformity with the earlier reports of Rao *et al.* (2004). It was remarkable to note that curcumin content showed positive and significant correlation only with days to 50 % plant emergence both at genotypic and phenotypic level. Thus, selection based on early

Table 3: Genetic parameters of rhizome yield and its component characters in turmeric

S. No.	Characters	Range	General mean	Variance (σ^2)		Coefficient of variation		Heritability (bs) %	Genetic advance (GA)	Genetic advance as per cent of mean (GA)
				Phenotypic (σ^2p)	Genotypic (σ^2g)	PCV (%)	GCV (%)			
1.	Days to 50% plant emergence	29.00 - 44.00	34.24	14.75	11.48	11.21	9.89	77.83	6.15	17.97
2.	Plant height	73.13 - 128.66	103.09	166.48	135.97	12.52	11.31	81.67	21.70	21.05
3.	Pseudostem girth	2.92 - 4.34	3.49	0.15	0.10	11.13	8.90	64.05	0.51	14.68
4.	Number of tillers per plant	1.60 - 4.00	2.54	0.36	0.26	23.65	19.98	71.32	0.88	34.75
5.	Number of leaves per plant	8.20 - 12.26	10.10	1.05	0.67	10.12	8.12	64.32	1.35	13.40
6.	Leaf area	550.04 - 850.10	656.55	4558.27	3340.01	10.28	8.80	73.27	101.90	15.52
7.	Crop duration	179.66 - 206.66	191.71	100.71	50.99	5.24	3.73	50.63	10.46	5.45
8.	Number of mother rhizomes per plant	1.00 - 3.00	1.64	0.22	0.19	28.60	26.44	85.48	0.82	50.35
9.	Weight of mother rhizome per plant	22.33 - 69.66	40.13	101.97	83.59	25.16	22.78	81.97	17.05	42.48
10.	Average weight of mother rhizome	11.16 - 42.79	25.54	47.77	43.87	27.06	25.93	91.83	13.07	51.18
11.	Number of primary rhizomes per plant	3.33 - 7.60	4.91	0.80	0.68	18.21	16.83	85.48	1.57	32.05
12.	Weight of primary rhizome per plant	41.00 - 167.33	83.62	761.11	704.74	32.99	31.75	92.59	52.62	62.92
13.	Average weight of primary rhizome	9.16 - 31.00	17.26	31.16	30.40	32.33	31.94	97.57	11.21	64.98
14.	Number of secondary rhizomes per plant	5.53 - 16.73	9.55	6.23	5.87	26.13	25.37	94.26	4.84	50.73
15.	Weight of secondary rhizome per plant	17.33 - 231.00	73.22	1464.34	1422.41	52.26	51.51	97.14	76.57	104.57
16.	Average weight of secondary rhizome	2.11 - 21.93	7.81	14.46	14.30	48.68	48.41	98.90	7.74	99.17
17.	Dry recovery	16.04 - 21.93	19.47	2.55	1.67	8.21	6.64	65.42	2.15	11.05
18.	Curcumin content	1.26 - 7.28	4.14	1.98	1.95	33.92	33.67	98.50	2.85	68.83
19.	Rhizome yield per plant	104.00 - 418.66	196.98	4152.24	4051.82	32.71	32.31	97.58	129.53	65.75

Table 4: Phenotypic (P) and Genotypic (G) correlation of coefficients among nineteen characters in turmeric

	Characters		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1.	Days to 50% plant emergence	P	1.000	-0.106	-0.186*	0.006	0.089	-0.241**	-0.058	-0.107	-0.283**	-0.151	-0.280**	-0.174*	0.049	-0.338**	-0.064	0.167*	-0.118	0.271**	-0.157*
		G	1.000	-0.111	-0.243**	-0.018	0.074	-0.285**	-0.106	-0.130	-0.354**	-0.176*	-0.338**	-0.198*	0.061	-0.409**	-0.080	0.189*	-0.172*	0.310**	-0.181*
2.	Plant height	P		1.000	0.547**	-0.533**	-0.447**	0.283**	-0.207**	0.025	-0.056	-0.077	0.234**	-0.130	-0.299**	0.076	-0.215**	-0.292**	-0.040	-0.166*	-0.192*
		G		1.000	0.490**	-0.469**	-0.358**	0.167*	-0.329**	0.043	-0.052	-0.089	0.250**	-0.178*	-0.344**	0.090	-0.238**	-0.326**	-0.053	-0.189*	-0.223**
3.	Pseudostem girth	P			1.000	-0.206**	-0.197*	0.194**	-0.078	-0.152	-0.067	0.091	0.170*	-0.049	-0.164*	0.114	0.017	-0.067	0.059	-0.038	-0.021
		G			1.000	0.005	0.028	0.002	-0.155*	-0.144	-0.033	0.113	0.187	-0.103	-0.218**	0.141	0.020	-0.086	0.109	-0.046	-0.036
4.	Number of tillers per plant	P				1.000	0.707**	0.241**	0.427**	0.127	0.356**	0.205**	-0.051	0.503**	0.554**	0.168*	0.643**	0.602**	0.051	-0.031	0.653**
		G				1.000	0.663**	0.564**	0.791**	0.147	0.436**	0.247**	-0.035	0.645**	0.669**	0.203	0.766**	0.713**	0.074	-0.045	0.786**
5.	Number of leaves per plant	P					1.000	0.142	0.399**	0.140	0.249**	0.080	-0.039	0.465**	0.513**	0.078	0.534**	0.543**	0.021	0.041	0.555**
		G					1.000	0.483**	0.746**	0.197*	0.331**	0.079	-0.020	0.646**	0.668**	0.099	0.674**	0.684**	0.077	0.044	0.716**
6.	Leaf area	P						1.000	0.431**	0.259**	0.348**	0.048	0.303**	0.611**	0.426**	0.438**	0.560**	0.358**	-0.044	-0.397**	0.649**
		G						1.000	0.679**	0.335**	0.474**	0.078	0.365**	0.727**	0.501**	0.541**	0.675**	0.424**	-0.045	-0.456	0.771**
7.	Crop duration	P							1.000	0.154*	0.341**	0.161*	-0.003	0.537**	0.548**	0.213**	0.515**	0.478**	-0.034	-0.166*	0.589**
		G							1.000	0.265**	0.579**	0.251**	-0.005	0.801**	0.793**	0.312**	0.729**	0.671**	0.001	-0.238**	0.849**
8.	Number of mother rhizomes per plant	P								1.000	0.505**	-0.570**	0.025	0.121	0.094	0.276**	0.046	-0.096	0.001	-0.302**	0.158*
		G								1.000	0.450**	-0.598**	0.062	0.156*	0.095	0.317**	0.060	-0.100	-0.030	-0.328**	0.165*
9.	Weight of mother rhizome per plant	P									1.000	0.398**	0.250**	0.408**	0.265**	0.395**	0.218**	0.062	0.057	-0.350**	0.461**
		G									1.000	0.431**	0.334**	0.487**	0.289**	0.443**	0.243**	0.070	0.021	-0.389**	0.491**
10.	Average weight of mother rhizome	P										1.000	0.184*	0.249**	0.158*	0.057	0.154*	0.169**	0.082	-0.032	0.260**
		G										1.000	0.204**	0.266**	0.166*	0.045	0.154*	0.173*	0.086	-0.037	0.264**
11.	Number of primary rhizomes per plant	P											1.000	0.276**	-0.254**	0.570**	0.110	-0.196*	0.008	-0.247**	0.222**
		G											1.000	0.210*	-0.286**	0.644**	0.126	-0.210**	-0.022	-0.270**	0.210**
12.	Weight of primary rhizome per plant	P												1.000	0.846**	0.200*	0.677**	0.638**	0.151	-0.330**	0.894**
		G												1.000	0.867**	0.219**	0.718**	0.667**	0.165*	-0.345**	0.912**
13.	Average weight of primary rhizome	P													1.000	-0.121	0.625**	0.770**	0.152	-0.178*	0.775**
		G													1.000	-0.124	0.643**	0.782**	0.182*	-0.182*	0.784**
14.	Number of secondary rhizomes per plant	P														1.000	0.343**	-0.149	-0.111	-0.283**	0.351**
		G														1.000	0.321**	-0.162*	-0.151	-0.295**	0.345**
15.	Weight of secondary rhizome per plant	P															1.000	0.860**	-0.009	-0.148	0.918**
		G															1.000	0.867**	-0.006	-0.151	0.927**
16.	Average weight of secondary rhizome	P																1.000	0.048	0.015	0.794**
		G																1.000	0.069	0.015	0.802**
17.	Dry recovery	P																	1.000	-0.068	0.068
		G																	1.000	-0.081	0.068
18.	Curcumin content	P																		1.000	-0.284**
		G																		1.000	-0.289**
19.	Rhizome yield per plant	P																			1.000
		G																			1.000

*, ** Significant at 5% and 1%, respectively.

Table 5: Direct (diagonal) and indirect effects of yield components on rhizome yield at phenotypic and genotypic levels in turmeric

	Character		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Correlation with yield
1.	Days to 50% plant emergence	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.044	0.000	0.000	-0.075	0.000	0.000	-0.038	0.000	0.000	0.000	-0.157
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.051	0.000	0.000	-0.083	0.000	0.000	-0.047	0.000	0.000	0.000	-0.181
2.	Plant height	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.009	0.000	0.000	-0.056	0.000	0.000	-0.128	0.000	0.000	0.000	-0.192
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.007	0.000	0.000	-0.074	0.000	0.000	-0.141	0.000	0.000	0.000	-0.223
3.	Pseudostem girth	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.011	0.000	0.000	-0.021	0.000	0.000	0.010	0.000	0.000	0.000	-0.021
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.005	0.000	0.000	-0.043	0.000	0.000	0.012	0.000	0.000	0.000	-0.036
4.	Number of tillers per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.056	0.000	0.000	0.216	0.000	0.000	0.382	0.000	0.000	0.000	0.653
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063	0.000	0.000	0.269	0.000	0.000	0.454	0.000	0.000	0.000	0.786
5.	Number of leaves per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.000	0.000	0.199	0.000	0.000	0.317	0.000	0.000	0.000	0.555
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.047	0.000	0.000	0.269	0.000	0.000	0.399	0.000	0.000	0.000	0.716
6.	Leaf area	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.262	0.000	0.000	0.332	0.000	0.000	0.000	0.649
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.000	0.303	0.000	0.000	0.400	0.000	0.000	0.000	0.771
7.	Crop duration	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.000	0.000	0.230	0.000	0.000	0.306	0.000	0.000	0.000	0.589
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.000	0.000	0.334	0.000	0.000	0.432	0.000	0.000	0.000	0.849
8.	Number of mother rhizomes per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.079	0.000	0.000	0.052	0.000	0.000	0.027	0.000	0.000	0.000	0.158
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.065	0.000	0.000	0.065	0.000	0.000	0.036	0.000	0.000	0.000	0.165
9.	Weight of mother rhizome per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.157	0.000	0.000	0.175	0.000	0.000	0.129	0.000	0.000	0.000	0.461
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.144	0.000	0.000	0.203	0.000	0.000	0.144	0.000	0.000	0.000	0.491
10.	Weight of single mother rhizome	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.062	0.000	0.000	0.106	0.000	0.000	0.091	0.000	0.000	0.000	0.260
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.062	0.000	0.000	0.111	0.000	0.000	0.091	0.000	0.000	0.000	0.264
11.	Number of primary rhizomes per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.000	0.000	0.118	0.000	0.000	0.065	0.000	0.000	0.000	0.222
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.000	0.000	0.087	0.000	0.000	0.075	0.000	0.000	0.000	0.210
12.	Weight of primary rhizome per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.064	0.000	0.000	0.428	0.000	0.000	0.402	0.000	0.000	0.000	0.894
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.070	0.000	0.000	0.417	0.000	0.000	0.425	0.000	0.000	0.000	0.912
13.	Weight of single primary rhizome	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.000	0.000	0.362	0.000	0.000	0.371	0.000	0.000	0.000	0.775
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.000	0.000	0.361	0.000	0.000	0.381	0.000	0.000	0.000	0.784
14.	Number of secondary rhizomes per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.062	0.000	0.000	0.085	0.000	0.000	0.204	0.000	0.000	0.000	0.351
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.064	0.000	0.000	0.091	0.000	0.000	0.190	0.000	0.000	0.000	0.345
15.	Weight of secondary rhizome per plant	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.000	0.290	0.000	0.000	0.594	0.000	0.000	0.000	0.918
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.000	0.299	0.000	0.000	0.592	0.000	0.000	0.000	0.927
16.	Weight of single secondary rhizome	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.273	0.000	0.000	0.511	0.000	0.000	0.000	0.794
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.278	0.000	0.000	0.513	0.000	0.000	0.000	0.802
17.	Dry recovery	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.065	0.000	0.000	-0.005	0.000	0.000	0.000	0.068
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.069	0.000	0.000	-0.004	0.000	0.000	0.000	0.068
18.	Curcumin content	P	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.055	0.000	0.000	-0.141	0.000	0.000	-0.088	0.000	0.000	0.000	-0.284
		G	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.056	0.000	0.000	-0.144	0.000	0.000	-0.090	0.000	0.000	0.000	-0.289

Residual effect (G)= 0.0002

emergence may improve curcumin content in turmeric genotypes. Path coefficient analysis revealed that weight of secondary rhizome per plant made maximum direct contribution and also exerted indirect influence towards rhizome yield per plant via weight primary rhizome per plant and weight of mother rhizome per plant. The weight of primary rhizome per plant is in next important to weight of secondary rhizome per plant, which had also positive direct effect on rhizome yield per plant and indirect effect through weight of mother rhizome per plant and weight of secondary rhizome per plant at both genotypic and phenotypic level. Similarly, weight of mother rhizome per plant showed low and positive direct effect but it influenced substantially the rhizome yield per plant indirectly through weight of primary rhizome per plant and weight of secondary rhizome per plant. Similar results were also reported by Prajapati *et al.* (2014) for weight of secondary rhizome and weight of mother rhizome per plant; Yadav *et al.* (2006) for weight of mother, primary and secondary rhizomes per plant; Chattopadhyay *et al.* (2004) for weight of primary and secondary rhizome per plant and Panja *et al.* (2002) for weight of mother and primary rhizomes per plant. The characters *viz.,* days to 50% plant emergence, plant height and curcumin content exerted negligible direct contribution towards rhizome yield per plant along with negative indirect contribution on rhizome yield per plant via weight of secondary rhizome per plant, weight of primary rhizome per plant and weight of mother rhizome per plant, thus suggested that simultaneous selection of genotype for these traits along with on rhizome yield per plant may not be rewarding. Low residual effect at genotypic level (0.0002) indicated that approximately 99.99% of variability could be explained through component characters under present investigation. On the basis of per se performance of the genotypes viz., CHFT-8, CHFT-61, CHFT-22 and CHFT-30 for rhizome yield and Megha Turmeric-1, CHFT- 17, CHFT-24 and CHFT- 14 for curcumin content were found to be best genotypes. So, these promising genotypes could be promoted for cultivation in plain area of Arunachal Pradesh.

सारांश

देश के विभिन्न हिस्सों से एकत्र किए गए हल्दी के 55 विविध प्रभेदों का मूल्यांकन 2010–11 के दौरान किया गया। विचरण विश्लेषण के अध्ययन से स्पस्ट हुआ कि सभी लक्षणों के लिए प्रभेदों के बीच सार्थक अंतर है। प्रति पौध द्वितीयक प्रकंदों का वजन, क्यूरक्यूमिन

की मात्रा, प्राथमिक प्रकंदों का औसत वजन, प्रति पौध प्राथमिक प्रकंदों का वजन, प्रति पौध मात्रा प्रकंदों की संख्या, मात्रा प्रकंदों का औसत वजन, प्रति पौध द्वितीयक प्रकंदों की संख्या, प्रति पौध मात्रा प्रकंदों का वजन और प्रति पौध पार्श्व से शाखाओं की संख्या का बाह्य स्वरूप और आनुवांशिक विविधता गुणांक, वंशागतित्व और आनुवांशिक उन्नयन प्रतिशत माध्यम आकलन उच्च पाया गया। सहसंबंध अध्ययन से स्पष्ट हुआ कि प्रति पौध प्रकंदों की उपज का सहसंबंध आनुवांशिक और बाह्य स्वरूप स्तर पर प्रति पौध प्रकंदों का वजन, प्रति पौध प्राथमिक प्रकंदों का वजन, फसल की अवधि, द्वितीयक प्रकंदों का औसत वजन, प्रति पौध टिलरो की संख्या, प्राथमिक प्रकंदों का औसत वजन, पत्ती क्षेत्रफल, प्रति पौध पत्तियों की संख्या, प्रति पौध मातृ प्रकंदों का वजन, प्रति पौध द्वितीयक प्रकंदों की संख्या, मात्रा प्रकंदों का औसत वजन और प्रति पौध मात्रा प्रकंदों की संख्या के साथ धनात्मक और सार्थक है। आनुवांशिक और बाह्य स्वरूप स्तर पर प्रति पौध प्रकंदों के उपज पर अधिकतम सकारात्मक प्रत्यक्ष प्रभाव प्रति पौध द्वितीयक प्रकंदों का वजन से इसके बाद प्रति पौध प्राथमिक और मातृ प्रकंदों के वजन से था। इससे स्पष्ट होता है कि इन लक्षणों पर आधारित चयन वांछिनीय है। प्रकंद उपज के लिए प्रभेद सीएचएफटी–8, सीएचएफटी–61, सीएचएफटी–22, और सीएचएफटी–30 तथा क्यूरक्यूमिन की मात्रा के लिए प्रभेद मेघा हल्दी–1, सीएचएफटी–14, सीएचएफटी–17 और सीएचएफटी–24 अच्छे पाये गये। इन प्रभेदों का प्रयोग आगे प्रकंदों के उपज और क्यूरक्यूमिन की मात्रा में सुधार के लिए किया जा सकता है।

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