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Studies on correlation and path analysis in turmeric (*Curcuma longa* L.)

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Abstract
At the College of Horticulture and Forestry in Jhalawar, Rajasthan, India, twenty-five genotypes of turmeric from various sections of the country were tested for growth, yield, and quality. The correlation and path, as well as the direct and indirect impact of various characters to fresh rhizome yield / plant, are assessed using a process of adjustment and method analysis. Rhizome yield has a strong relationship with primary rhizome weight, followed by secondary and mother rhizome weight, plant height, number of leaves / plants, curing %, number of tillers / plant, and number of secondary and primary rhizome. The weight of the primary rhizome has the greatest impact on rhizome yield, followed by the weight of the secondary and mother rhizomes, the number of secondary and primary rhizomes, the number of leaves per plant, the number of tillers per plant, and the curcumin content. Studies have shown that selecting an extra primitive weight, followed by the weight of the secondary rhizome, and finally the weight of the mother, can be very effective in increasing rhizome production in turmeric, as it has a significant positive effect and a very observable combination of rhizome yield / plant.

Keywords: Turmeric, rhizome, path and correlation coefficient

Introduction
Turmeric is the dried rhizome of *Curcuma longa* L., a long-lived Zingiberaceae tree indigenous to South East Asia, particularly India. Rhizomes are used to propagate this plant. The leaves are long, broad, pale green and long and broad. The flowers are a bright yellow colour and grow in dense spikes. Pseudostems are not as long as leaves. 7 to 9 months after planting, the rhizomes are ready to harvest. Turmeric (Curcuma longa L.), also known as 'Indian saffron,' is a popular commercial spice crop cultivated in India. It is often used in religious rites and rituals as a symbol of good health. Turmeric is a dried subterranean rhizome with a bright yellow colour and a pleasant perfume due to the presence of the colouring ingredient 'curcumin' and the distinct oil 'termerol.' Towards the end of cancer therapy, it is also a significant component that finds a unique place in culinary art and as a colouring agent in the food, confectionary, textile, cosmetics, and pharmaceuticals industries.
Telangana is India's largest state, covering 42,000 hectares and producing 184 thousand MT, followed by Tamil Nadu. Andhra Pradesh, Karnataka, Gujarat, West Bengal, and Assam are among the states that produce turmeric (Anonymous, 2016) [2]. Turmeric is cultivated on 140 hectares in Rajasthan, producing 370 metric tonnes of new turmeric. Turmeric is grown at Bundi, Chittor, Dungarpur, and Bilwara, among other places (GOR, 2015-16).
Turmeric has a huge variety of genotypes, with considerable differences in morphological and yield attributes, and numerous attempts to assess this diversity have been done. Flexibility studies do not show the extent or type of the relationships that exist between characters, but they do give information about their level of growth in many areas. As a result, in order to boost yields, logical approaches should be used in production, as genes can only be of different production elements, not yield. Furthermore, because many of these contributing individuals give with both positive and negative attitudes, understanding the relationships between characters and economics is critical. Al-Jibouri *et al*. (1958) [1] computed genotypic and phenotypic interactions, and Dewey and Lu obtained direct and indirect techniques, respectively (1959). The relationship and corresponding contribution of independent characters to the dependent variables are provided by the analysis and equity of the approach evaluated together.

Material and Method
During the 2016-17 academic year, researchers from the College of Horticulture and Forestry

in Jhalarapatan city, Jhalawar, Rajasthan, tested twenty-five turmeric genotypes in RBD with three responses. On a 1m x 1m building scale, each genotype was planted in 45 (Row x Row) 20 cm (Plant x Plant) area. Five randomly selected plants from each replication of growth, yield, and quality attributes were studied. Plant height, number of leaves and tillers per plant, leaf width and length, stem diameter, days to harvest, number of mothers, primary and secondary rhizome per plant, length of mother, primary and secondary rhizome per plant, diameter of mother, primary and secondary rhizome per plant, fresh and dry weight of rhizome per plant, yield per plant, and curcumin content were all recorded, and mean values were correlated and path analysed.

Result and Discussion

The type of relationship that exists between rhizome yield per plant and its component characters is determined by estimating phenotypic and genotypic correlations at twenty characters, and the results are presented in Tables 1 and 2. The phenotypic and genotypic correlation coefficients between different characters revealed that yield per plant was significantly associated with dry weight of rhizomes per plant, stem diameter, length of mother rhizomes / plant, plant height, diameter of mother and primary rhizomes per plant, length of primary rhizomes per plant, number of primary and secondary rhizomes per plant, fresh weight of primary rhizomes per plant, leaf width and leaf length, while yield per plant. While the number of tillers per plant and the number of mother rhizomes per plant showed significant and negative associations. Similar correlations of yield with other contributing traits to different extents in turmeric have been investigated by Pathania *et al*. (1981), Shashidhar *et al*. (1997) [8], Shashidhar and Sulikeri (1997) [9], Lynrah *et al*. (1998) [6], Venkatesha *et al*. (1998) [11], Panja *et al*. (2002) [7], Rao *et al*. (2004) [13], Tomar *et al*. (2005) [16], Kumar *et al*. (2006) [4], Yadav *et al*. (2006) [12], Kumar *et al*. (2007) [5], Velmurugan *et al*. (2008) [10], Sharon *et al*. (2011) [14] and Singh *et al*. (2012) [15].

The cause and effect of the relationship between each harvest and nineteen yield components were analysed using a method equation analysis to determine the developmental connection, and the results are provided in Tables 3 and 4. On a phenotypic level, the dry weight of the rhizomes has a perfect direct effect on the production of each plant after the diameter of the stem, fresh weight of primary rhizomes, length of primary and secondary rhizomes per plant, length of mother rhizomes per plant, days to harvest, curcumin content, plant height, number of primary rhizomes per plant, diameter of primary rhizomes per plant, leaf length, number of mother and secondary rhizomes per plant. While, the direct negative effect of leaf width, the number of tillers per plant, fresh weight of secondary rhizomes per plant, diameter of mother rhizomes per plant, number of leaves per plant and number of secondary rhizomes per plant are seen in the yield per plant.

Data concern in the genotypic path has shown that the number of secondary rhizomes per plant has a maximum positive effect on the yield of each plant followed by leaf length, diameter of mother rhizomes per plant, number of mother rhizomes per plant, length of primary rhizomes per plant, diameter of secondary rhizomes per plant, length of secondary rhizomes per plant, diameter of primary rhizomes per plant, curcumin content, length of mother rhizomes per plant and diameter of stem. While, the direct negative effect of the number of primary rhizomes per plant, fresh weight of secondary rhizomes per plant, leaf width, days to harvest, number of tillers per plant, dry weight of rhizomes per plant, fresh weight of primary rhizomes per plant, number of tillers per plant and plant height is determined by the yield per plant.

Table 1: The phenotypic coefficients of correlation between the various characters in turmeric

Character	PH	NTP	NLP	LW	LL	DS	DMR	DPR	DSR	LMR	LPR	LSR	NMR	NPR	NSR	FwPR	FwSR	DwR	DH	CC	YPP
PH	1.000	-0.001	0.028	0.502	0.572**	0.501**	0.171**	0.116	-0.111	0.267	0.199*	0.006	-0.312	0.411**	0.522**	0.463**	-0.121**	0.445	0.027**	0.183	0.532*
NTP		1.000	-0.043	-0.110	0.172	-0.336	-0.570**	-0.375**	0.228**	-0.621*	0.107**	0.368	-0.042**	-0.280	-0.080*	0.171	0.259	-0.498*	0.050**	0.080	-0.464**
NLP			1.000	0.208	-0.087	0.156	0.025	0.036	-0.072	-0.012	0.002	-0.045	0.363	0.064**	0.007	0.062	-0.066	0.1825	-0.363	0.152**	0.068
LW				1.000	0.229	0.487*	0.091**	-0.060	-0.276	0.309*	0.216**	-0.032	-0.276	0.437*	0.517**	0.340**	-0.319**	0.314**	-0.223**	0.077	0.255*
LL					1.000	0.250	-0.058*	-0.092	-0.125	-0.095	0.131	-0.055	-0.317	0.426**	0.169**	0.187	0.012	0.176	0.070	0.213	0.228*
DS						1.000	0.199	0.113	-0.291	0.514*	0.068**	-0.186	-0.288	0.519*	0.526**	0.100**	-0.247	0.597*	-0.272**	0.076*	0.637**
DMR							1.000	0.366	-0.067**	0.594	0.077**	-0.155	-0.032	0.203	0.034	0.118	-0.211	0.581	-0.028**	0.052	0.500**
DPR								1.000	0.305	0.125**	-0.043	0.008	-0.015	-0.231	-0.209*	0.082	-0.026	0.389	-0.025**	0.269	0.400**
DSR									1.000	-0.291	0.012*	0.436	0.052**	-0.552	-0.231**	0.084*	0.264	0.001*	0.122	0.144	0.016
LMR										1.000	0.149	-0.228	-0.157*	0.411	0.346**	0.106**	-0.285	0.480*	0.033**	-0.338	0.535**
LPR											1.000	0.238	-0.109*	-0.004	0.006	0.167	0.259	0.242*	0.066*	-0.065	0.304**
LSR												1.000	0.035	-0.242	0.045*	0.093	0.367	-0.038**	-0.014	0.087	0.033
NMR													1.000	-0.283	-0.313*	-0.391**	0.396**	-0.050**	-0.221	0.071	-0.227*
NPR														1.000	0.653	0.019**	-0.408	0.250**	-0.016*	-0.119	0.290*
NSR															1.000	0.256	-0.134*	0.172	0.051	-0.152	0.260*
FWPR																1.000	-0.099	0.076	-0.128	0.025	0.259*
FWSR																	1.000	-0.168	-0.038	0.062	-0.182
DWR																		1.000	-0.302	0.283**	0.839**
DH																			1.000	-0.345	-0.128
CC																				1.000	0.189

*Significant at 5% level of significance **Significant at 1% level of significance

Where, PH= Plant height, NTP= Number of tillers/plant, NLP= Number of leaves/plant, LW= Leaf width, LL= Leaf length, DS= Diameter of stem, DMR= Diameter of mother rhizomes/plant, DPR= Diameter of primary rhizomes/plant, DSR= Diameter of secondary rhizomes/plant, LMR= Length of mother rhizomes/plant, LPR= Length of primary rhizomes/plant, LSR= Length of secondary rhizomes/plant, NMR= Number of mother rhizomes/plant, NPR= Number of primary rhizomes/plant, NSR= Number of secondary rhizomes/plant, Fw PR= Fresh weight of primary rhizomes/plant, Fw SR=Fresh weight of secondary rhizomes/plant, DWR= Dry weight of rhizomes/plant, DH= Days to harvest, CC= Curcumin content and YPP= Yield/plant

Table 2: The genotypic coefficients of correlation between the various characters in turmeric

Character	PH	NTP	NLP	LW	LL	DS	DMR	DPR	DSR	LMR	LPR	LSR	NMR	NPR	NSR	FwPR	FwSR	DwR	DH	CC	YPP
PH	1.000	0.012	0.059	0.609**	0.632**	0.645**	0.192	0.085	-0.094	0.317**	0.310*	-0.052	-0.394**	0.464**	0.629**	0.532**	-0.141	0.486**	0.006	0.198	0.576**
NTP		1.000	-0.103	-0.171	0.173	-0.481**	-0.697**	-0.601**	0.438**	-0.711**	0.014	0.639**	-0.012	-0.345**	-0.136	0.209	0.269	-0.551**	0.026	0.101	-0.500**
NLP			1.000	0.226*	-0.121	0.140	0.110	0.126	0.038	-0.013	-0.092	-0.031	0.553**	0.058	-0.027	0.073	-0.060	0.235*	-0.499**	0.219	0.074
LW				1.000	0.224*	0.609**	0.184	-0.040	-0.376**	0.352**	0.226*	-0.013	-0.274*	0.508**	0.638**	0.376**	-0.344	0.338**	-0.282*	0.090	0.280*
LL					1.000	0.304**	-0.069	-0.136	-0.186	-0.107	0.164	-0.050	-0.333**	0.454**	0.177	0.195	0.011	0.175	0.071	0.219	0.234*
DS						1.000	0.333**	0.386**	-0.348**	0.576**	0.015	-0.186	-0.338**	0.625**e	0.678**	0.126	-0.278	0.687**	-0.321**	0.101	0.720**
DMR							1.000	0.516**	-0.181	0.712**	0.181	-0.395**	-0.062	0.234*	0.023	0.101	-0.232	0.669**	-0.032	0.048	0.568**
DPR								1.000	0.586**	0.238*	0.011	-0.297**	-0.043	-0.399**	-0.268*	0.193	-0.034	0.666**	-0.126	0.509**	0.657**
DSR									1.000	-0.400**	0.343*	0.623**	0.152	-0.731**	-0.395**	0.137	0.399	-0.008	0.151	0.179	0.026
LMR										1.000	0.201	-0.319**	-0.156	0.469**	0.421**	0.098	-0.302	0.501**	0.077	-0.355**	0.567**
LPR											1.000	0.557**	-0.138	-0.058	0.089	0.231	0.310	0.305**	0.035	-0.073	0.389**
LSR												1.000	0.145	-0.224*	0.182	0.131	0.481	-0.051	-0.039	0.117	0.031
NMR													1.000	-0.361**	-0.407**	-0.468**	0.445	-0.048	-0.273*	0.066	-0.254*
NPR														1.000	0.696**	0.007	-0.434	0.261*	-0.020	-0.126	0.306**
NSR															1.000	0.270*	-0.143	0.190	0.063	-0.179	0.291*
FWPR																1.000	-0.108	0.077	-0.140	0.011	0.267*
FWSR																	1.000	-0.172	-0.051	0.059	-0.183
DWR																		1.000	-0.328**	0.287*	0.847**
DH																			1.000	-0.368**	-0.144
CC																				1.000	0.191

*Significant at 5% level of significance **Significant at 1% level of significance

Where, PH= Plant height, NTP= Number of tillers/plant, NLP= Number of leaves/plant, LW= Leaf width, LL= Leaf length, DS= Diameter of stem, DMR= Diameter of mother rhizomes/plant, DPR= Diameter of primary rhizomes/plant, DSR= Diameter of secondary rhizomes/plant, LMR= Length of mother rhizomes/plant, LPR= Length of primary rhizomes/plant, LSR= Length of secondary rhizomes/plant, NMR= Number of mother rhizomes/plant, NPR= Number of primary rhizomes/plant, NSR= Number of secondary rhizomes/plant, FwPR= Fresh weight of primary rhizomes/plant, FwSR=Fresh weight of secondary rhizomes/plant, DWR= Dry weight of rhizomes/plant, DH= Days to harvest, CC= Curcumin content and YPP= Yield/plant

Table 3: Estimates the phenotypic direct and indirect effects of different characters on yield of turmeric

Character	PH	NTP	NLP	LW	LL	DS	DMR	DPR	DSR	LMR	LPR	LSR	NMR	NPR	NSR	FwPR	FwSR	DwR	DH	CC
PH	0.072	-0.000	0.002	0.036	0.041	0.036	0.012	0.008	-0.00	0.019	0.014	0.000	-0.022	0.029	0.037	0.033	-0.008	0.032	0.002	0.013
NTP	0.000	-0.213	0.009	0.023	-0.036	0.071	0.121	0.080	-0.048	0.132	-0.022	-0.078	0.009	0.059	0.017	-0.036	-0.055	0.106	-0.010	-0.017
NLP	-0.001	0.001	-0.034	-0.007	0.003	-0.005	-0.000	-0.001	0.002	0.000	-0.000	0.001	-0.012	-0.002	-0.000	-0.002	0.002	-0.006	0.012	-0.005
LW	-0.132	0.029	-0.054	-0.263	-0.060	-0.128	-0.024	0.016	0.072	-0.081	-0.057	0.008	0.073	-0.115	-0.136	-0.089	0.084	-0.082	0.058	-0.020
LL	0.023	0.006	-0.003	0.009	0.040	0.010	-0.002	-0.003	-0.005	-0.003	0.005	-0.002	-0.012	0.017	0.006	0.007	0.000	0.007	0.002	0.008
DS	0.148	-0.099	0.046	0.144	0.074	0.296	0.059	0.033	-0.086	0.152	0.020	-0.055	-0.085	0.154	0.156	0.029	-0.073	0.177	-0.080	0.022
DMR	-0.015	0.050	-0.002	-0.008	0.005	-0.017	-0.089	-0.032	0.006	-0.053	-0.006	0.013	0.002	-0.018	-0.003	-0.010	0.018	-0.051	0.002	-0.004
DPR	0.005	-0.016	0.001	-0.002	-0.004	0.005	0.016	0.043	0.013	0.005	-0.001	0.000	-0.000	-0.010	-0.009	0.003	-0.001	0.017	-0.001	0.011
DSR	-0.003	0.007	-0.002	-0.008	-0.003	-0.008	-0.002	0.009	0.030	-0.008	0.000	0.013	0.001	-0.016	-0.007	0.002	0.008	0.000	0.003	0.004
LMR	0.025	-0.059	-0.001	0.029	-0.009	0.049	0.057	0.012	-0.028	0.096	0.014	-0.022	-0.015	0.039	0.033	0.010	-0.027	0.046	0.003	-0.032
LPR	0.034	0.018	0.000	0.037	0.022	0.011	0.013	-0.007	0.002	0.025	0.171	0.041	-0.018	-0.000	0.001	0.028	0.044	0.041	0.011	-0.011
LSR	0.001	0.058	-0.007	-0.005	-0.008	-0.029	-0.024	0.001	0.069	-0.036	0.038	0.159	0.005	-0.038	0.007	0.014	0.058	-0.006	-0.002	0.014
NMR	-0.012	-0.001	0.014	-0.011	-0.012	-0.011	-0.001	-0.000	0.002	-0.006	-0.004	0.001	0.040	-0.011	-0.012	-0.015	0.016	-0.002	-0.009	0.002
NPR	0.018	-0.012	0.002	0.019	0.019	0.023	0.009	-0.010	-0.024	0.018	-0.000	-0.010	-0.012	0.044	0.029	0.000	-0.018	0.011	-0.000	-0.005
NSR	-0.009	0.001	-0.000	-0.009	-0.003	-0.009	-0.000	0.003	0.004	-0.006	-0.000	-0.000	0.005	-0.012	-0.018	-0.004	0.002	-0.003	-0.000	0.002
FwPR	0.113	0.041	0.015	0.083	0.045	0.024	0.028	0.020	0.020	0.026	0.041	0.022	-0.095	0.004	0.062	0.244	-0.024	0.018	-0.031	0.006
FwSR	0.015	-0.032	0.008	0.039	-0.001	0.031	0.026	0.003	-0.033	0.035	-0.032	-0.045	-0.049	0.051	0.016	0.012	-0.124	0.021	0.004	-0.007
DwR	0.229	-0.256	0.094	0.161	0.091	0.307	0.299	0.200	0.001	0.247	0.125	-0.020	-0.025	0.129	0.089	0.039	-0.086	0.515	-0.155	0.146
DH	0.002	0.004	-0.034	-0.021	0.006	-0.025	-0.002	-0.002	0.011	0.003	0.006	-0.001	-0.020	-0.001	0.004	-0.012	-0.003	-0.028	0.094	-0.032
CC	0.017	0.007	0.014	0.007	0.020	0.007	0.004	0.025	0.013	-0.031	-0.006	0.008	0.006	-0.011	-0.014	0.002	0.005	0.026	-0.032	0.093
YPP	0.532	-0.464	0.068	0.255	0.228	0.637	0.500	0.400	0.016	0.535	0.304	0.033	-0.227	0.290	0.260	0.259	-0.182	0.839	-0.128	0.189
Partial R^2	0.038	0.099	-0.002	-0.067	0.009	0.189	-0.044	0.017	0.000	0.051	0.052	0.005	-0.009	0.012	-0.0048	0.063	0.022	0.432	-0.012	0.017

Residual effect= 0.3572

Where, PH= Plant height, NTP= Number of tillers/plant, NLP= Number of leaves/plant, LW= Leaf width, LL= Leaf length, DS= Diameter of stem, DMR= Diameter of mother rhizomes/plant, DPR= Diameter of primary rhizomes/plant, DSR= Diameter of secondary rhizomes/plant, LMR= Length of mother rhizomes/plant, LPR= Length of primary rhizomes/plant, LSR= Length of secondary rhizomes/plant, NMR= Number of mother rhizomes/plant, NPR= Number of primary rhizomes/plant, NSR= Number of secondary rhizomes/plant, FwPR= Fresh weight of primary rhizomes/plant, FwSR=Fresh weight of secondary rhizomes/plant, DWR= Dry weight of rhizomes/plant, DH= Days to harvest, CC= Curcumin content and YPP= Yield/plant

Table 4: Estimates the genotypic direct and indirect effects of different characters on yield of turmeric

Character	PH	NTP	NLP	LW	LL	DS	DMR	DPR	DSR	LMR	LPR	LSR	NMR	NPR	NSR	FwPR	FwSR	DwR	DH	CC
PH	-0.201	-0.002	-0.012	-0.123	-0.127	-0.130	-0.038	-0.017	0.019	-0.064	-0.062	0.010	0.079	-0.093	-0.127	-0.107	0.028	-0.098	-0.001	-0.040
NTP	-0.010	-0.794	0.081	0.136	-0.137	0.382	0.554	0.477	-0.348	0.564	-0.011	-0.508	0.009	0.274	0.108	-0.166	-0.213	0.437	-0.020	-0.080
NLP	-0.014	0.024	-0.241	-0.054	0.029	-0.034	-0.026	-0.030	-0.009	0.003	0.022	0.007	-0.133	-0.014	0.006	-0.017	0.014	-0.056	0.120	-0.053
LW	-0.725	0.204	-0.269	-1.190	-0.266	-0.725	-0.219	0.048	0.447	-0.420	-0.269	0.015	0.326	-0.604	-0.759	-0.448	0.410	-0.403	0.336	-0.107
LL	1.089	0.299	-0.209	0.385	1.721	0.524	-0.119	-0.234	-0.320	-0.185	0.282	-0.086	-0.574	0.781	0.305	0.336	0.020	0.302	0.123	0.377
DS	0.001	-0.001	0.000	0.001	0.000	0.002	0.001	0.001	-0.001	0.001	0.000	-0.000	-0.001	0.001	0.002	0.000	-0.000	0.002	-0.000	0.000
DMR	0.182	-0.662	0.104	0.174	-0.065	0.316	0.949	0.490	-0.172	0.676	0.172	-0.375	-0.059	0.222	0.021	0.095	-0.221	0.635	-0.030	0.045
DPR	0.013	-0.095	0.020	-0.006	-0.021	0.061	0.082	0.158	0.093	0.037	0.001	-0.047	-0.006	-0.063	-0.042	0.030	-0.005	0.105	-0.020	0.081
DSR	-0.030	0.138	0.012	-0.119	-0.059	-0.110	-0.057	0.185	0.316	-0.127	0.109	0.197	0.048	-0.231	-0.125	0.043	0.126	-0.002	0.047	0.056
LMR	0.012	-0.027	-0.000	0.013	-0.004	0.022	0.027	0.009	-0.015	0.039	0.007	-0.012	-0.006	0.018	0.016	0.003	-0.011	0.019	0.003	-0.013
LPR	0.205	0.009	-0.061	0.149	0.108	0.010	0.120	0.007	0.227	0.133	0.661	0.368	-0.091	-0.039	0.059	0.152	0.205	0.201	0.023	-0.048
LSR	-0.012	0.156	-0.007	-0.003	-0.012	-0.045	-0.096	-0.072	0.152	-0.078	0.136	0.244	0.035	-0.055	0.044	0.032	0.117	-0.012	-0.009	0.028
NMR	-0.279	-0.008	0.392	-0.194	-0.236	-0.239	-0.044	-0.031	0.107	-0.110	-0.098	0.103	0.708	-0.256	-0.288	-0.331	0.315	-0.034	-0.194	0.046
NPR	-0.848	0.631	-0.106	-0.929	-0.830	-1.143	-0.428	0.730	1.336	-0.859	0.107	0.410	0.661	-1.828	-1.272	-0.014	0.795	-0.478	0.037	0.231
NSR	1.526	-0.329	-0.066	1.547	0.429	1.643	0.055	-0.649	-0.957	1.022	0.218	0.442	-0.987	1.687	2.424	0.656	-0.347	0.462	0.153	-0.435
FwPR	-0.142	-0.056	-0.019	-0.100	-0.052	-0.033	-0.027	-0.051	-0.036	-0.026	-0.061	-0.035	0.125	-0.002	-0.072	-0.267	0.029	-0.020	0.037	-0.003
FwSR	0.233	-0.446	0.099	0.571	-0.019	0.462	0.386	0.057	-0.661	0.502	-0.515	-0.797	-0.738	0.721	0.237	0.179	-1.658	0.286	0.085	-0.098
DwR	-0.426	0.483	-0.206	-0.297	-0.154	-0.602	-0.587	-0.584	0.007	-0.439	-0.267	0.045	0.042	-0.229	-0.167	-0.067	0.151	-0.877	0.288	-0.252
DH	-0.006	-0.028	0.553	0.313	-0.079	0.355	0.035	0.139	-0.167	-0.085	-0.038	0.043	0.303	0.022	-0.070	0.155	0.056	0.363	-1.106	0.407
CC	0.009	0.005	0.010	0.004	0.010	0.004	0.002	0.024	0.008	-0.017	-0.003	0.005	0.003	-0.006	-0.008	0.000	0.002	0.014	-0.018	0.048
YPP	0.576	-0.500	0.074	0.280	0.234	0.720	0.568	0.657	0.026	0.567	0.389	0.031	-0.254	0.306	0.291	0.267	-0.183	0.847	-0.144	0.191
Partial R^2	-0.116	0.397	-0.018	-0.334	0.403	0.002	0.539	0.104	0.008	0.022	0.257	0.007	-0.180	-0.560	0.706	-0.071	0.304	-0.743	0.159	0.009

Residual effect= 0.3194

Where, PH= Plant height, NTP= Number of tillers/plant, NLP= Number of leaves/plant, LW= Leaf width, LL= Leaf length, DS= Diameter of stem, DMR= Diameter of mother rhizomes/plant, DPR= Diameter of primary rhizomes/plant, DSR= Diameter of secondary rhizomes/plant, LMR= Length of mother rhizomes/plant, LPR= Length of primary rhizomes/plant, LSR= Length of secondary rhizomes/plant, NMR= Number of mother rhizomes/plant, NPR= Number of primary rhizomes/plant, NSR= Number of secondary rhizomes/plant, FwPR= Fresh weight of primary rhizomes/plant, FwSR=Fresh weight of secondary rhizomes/plant, DWR= Dry weight of rhizomes/plant, DH= Days to harvest, CC= Curcumin content and YPP= Yield/plant

Conclusion

The goal of this research was to look at the correlation coefficient and path coefficient for selecting elite material for further development. For all of the characters, the phenotypic coefficient of variation was greater than the genotypic coefficient of variation, indicating that the environment played a significant influence in affecting the expression of the characters. The high value of PCV and GCV suggested a higher phenotypic and genotypic diversity among genotypes, implying that responsiveness to selection for these components would be quite high, ultimately leading to yield enhancement in the turmeric crop. The yield per plant had a positive and significant correlation with dry weight of rhizomes per plant, diameter of stem, length of mother rhizomes per plant, plant height, diameter of mother and primary rhizomes per plant, length of primary rhizomes per plant, number of primary and secondary rhizomes per plant, fresh rhizomes per plant, and fresh rhizomes per plant, according to a study of phenotypic and genotypic correlation coefficient As a result, it shows the significance of these traits in determining breeding programmes for the production of superior turmeric genotypes.

The number of secondary rhizomes has the greatest positive direct effect on yield per plant, followed by diameter of stem, fresh weight of primary rhizomes, length of primary, secondary and mother rhizomes per plant, days to harvest, curcumin content, plant height, number and diameter of primary rhizomes per plant, leaf length, number of mother and secondary rhizomes per plant. While, negative direct effect of leaf width, number of tillers per plant, fresh weight of secondary rhizomes per plant, diameter of mother rhizomes per plant, number of leaves per plant and number of secondary rhizomes per plant were observed on yield per plant; indicating that selection should be made on the basis of these characters for improvement in turmeric.

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