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EVALUATION OF EARLY CAULIFLOWER (*BRASSICA OLERACEA* VAR. *BOTRYTIS* L.) GERMPLASM UNDER TROPICAL CONDITIONS FOR VARIOUS HORTICULTURAL TRAITS

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ABSTRACT
An experiment was conducted to evaluate the early cauliflower (*Brassica oleracea* var. *botrytis* L.) germplasm under tropical conditions. High variability (> 20%) and heritability (> 60%) with high genetic advance (> 20%) was observed for characters like, plant weight, leaf weight, curd size, net curd weight, net plot yield, yield per hectare, protein, vitamin-C and marketable curd weight indicating these characters are governed by additive gene action. Hence, direct selection may be followed for the improvement of early cauliflower for these characters. Marketable curd weight showed highly significant positive association with plant weight, leaf number, leaf length, leaf breadth, leaf weight, curd depth, curd diameter, curd size, net curd weight, net plot yield and yield per hectare at both genotypic and phenotypic levels. So for the genetic improvement of cauliflower through marketable curd weight, selection based on the above characters is desirable. Direct and indirect effects showed that during the selection of superior genotypes in early cauliflower emphasis should be given for plant and leaf parameters like, plant weight, leaf number, leaf length and curd parameters like, curd size and net curd weight.

INTRODUCTION

Cauliflower (*Brassica oleracea* var. *botrytis* L.) belongs to Cruciferae family. It is one of the most important and popular vegetable in the country. It is mainly grown for its curds which are rich in vitamin C (Ascorbic acid) and protein (Keck, 2004). A high intake of cauliflower has been associated with reduced risk of aggressive prostate cancer (Kushwaha *et al*., 2013). It is generally used as a cooked vegetable either singly or mixed with other vegetables.

Crop improvement mainly depends upon the presence of wide genetic variability in the germplasm followed by adopting of suitable breeding method (Singh *et al*., 2014a). If vast amount of variability is present, attempts can be made to improve the crop by enforcing mere selection, otherwise, variability may have to be generated by hybridization, mutation or by germplasm collection before taking up selection. The response to selection is more in highly heritable character and the effectiveness of selection can be predicted by estimating the heritability.

Agronomic traits such as curd yield and its components are major selection criteria for increasing its productivity (Yanglem and Tumbare, 2014). Yield is a complex character predominantly governed by large number of genes and it is largely affected by environmental fluctuations. Therefore, selection based on yield alone is not effective. Therefore improvement in yield can be brought about by affecting indirect selection for yield attributing components. Mutual association of plant characters, which is determined by correlation coefficients, is useful as a basis for selecting the desirable lines (Sheemar *et al*., 2012). The method of path coefficient analysis is helpful in partitioning the correlation coefficients into direct and indirect effects and in the assessment of relative contribution of each component to yield (Singh *et al*., 2014a). Keeping these aspects in view, the present investigation was carried out to estimate the genetic variability, heritability and character association of various quantitative and qualitative characters in early cauliflower germplasm.

MATERIALS AND METHODS

The present investigation was under taken at the vegetable farm of the Division of Vegetable Crops, Indian Institute of Horticultural Research (IIHR), Bengaluru. The experimental material comprised of 51 genotypes of early cauliflower maintained in the Division of Vegetable Crops, IIHR, Bengaluru. The experiment was laid out in a randomized complete block design (RCBD) with two replications. The sowing of all genotypes was done in nursery bed and 23 days old seedlings were transplanted at the spacing of 50 cm between rows and 40 cm between plants within the rows. Sixty plants were maintained in each genotype per replication. The package of practices to raise successful crop of cauliflower was followed. Ten plants were randomly selected from each replication per genotype for recording the eighteen traits. The mean value was used as the replicated data and was subjected to statistical analysis using INDOSTAT software package. The data of both quantitative and qualitative characters were statistically analyzed as per methods out lined by Cochran and Cox (1959), for estimating the analysis of variance (ANOVA). The phenotypic and genotypic coefficient of variability, heritability in broad sense, genetic advance at 5 per cent selection intensity were computed as suggested by Johnson *et al.* (1955). The phenotypic and genotypic correlation coefficients among all the traits under study were calculated following Weber and Murthy (1952) and the path analysis was carried out as per method of Dewey and Lu (1959).

RESULTS AND DISCUSSION

Estimates of various genetic parameters are presented in Table 1. The genotypes exhibited large amount of variation for all the 18 characters studied. This wide range of variability for different characters indicated the scope for selection of suitable initial material for breeding, in the improvement of early cauliflower.

The degree of variability shown by different parameters can be judged by the magnitude of genotypic coefficient variation (GCV) and phenotypic coefficient variation (PCV). The GCV values were low in magnitude compared to PCV values for all the characters studied. This indicated that the direct selection is not effective for these characters and heterosis breeding can be resorted for further improvement. Similar observations were made by Singh *et al.* (2010) and Mehra and Singh (2013) in cauliflower.

High magnitude of phenotypic and genotypic coefficients of variation (> 20%) were recorded by plant weight, leaf weight, curd size, net curd weight, net plot yield, yield per hectare, protein, vitamin-C and marketable curd weight, indicating the maximum variability among the genotypes for these parameters. High magnitude of phenotypic and genotypic coefficients of variation were also observed by Mahajan and Gill (1997), Mehra and Singh (2013) in cauliflower for above parameters.

The heritability estimates separates the environmental influence from the total variability and indicates the accuracy with which a genotype can be identified by its phenotypic performance, thus making selection most effective. In the present study high heritability estimates (>60%) were obtained for days to 50 per cent curd initiation, plant weight, leaf number, leaf weight, curd diameter, curd size, net curd weight, net plot yield, yield per hectare, protein, vitamin-C and marketable curd weight indicating the possibility of selection for the improvement of genotypes for these characters, according to their economic importance. In cauliflower Dhatt and Garg (2008) also observed high heritability for above mentioned traits.

Heritability estimates in broad sense alone do not act as true indicators of effectiveness of selection for the trait since their scope is restricted by their interaction with the environment (Johnson *et al.*, 1955). Hence heritability values considered along with the predicted genetic gain increase the reality of this parameter as a tool in selection program.

It was observed that high heritability values were associated with high values of genetic advance as per cent of mean (> 20%) (Table 2) for plant weight, leaf weight, curd diameter, curd size, net curd weight, net plot yield, yield per hectare, protein, vitamin-C, marketable curd weight; high heritability values with moderate genetic advance (10-20%) for leaf number indicating utility of selection for improving the genotypes for these characters. Mehra and Singh (2013) reported high heritability with high genetic advance for net

Table 1: Estimates of genotypic and phenotypic variance, heritability and genetic advance in 51 genotypes of early cauliflower

Sl. No.	Characters	Range Min	Max	Mean	Genotypic variance	Phenotypic variance	Genotypic coefficient of variation	Phenotypic coefficient of variation	Heritability (%)	Genetic advance	Genetic advance as % of mean
1	Days to 50% curd initiation	36.00	47.00	39.35	4.27	6.24	5.25	6.35	68.40	3.52	8.94
2	Days to 50% curd maturity	48.00	58.50	54.93	2.81	7.55	3.05	5.00	37.22	2.11	3.84
3	Plant weight (g)	256.00	816.00	555.43	19279.06	22524.14	25.00	27.02	85.59	264.62	47.64
4	Leaf number	11.40	19.30	15.40	2.56	4.23	10.40	13.36	60.59	2.57	16.67
5	Leaf length (cm)	20.30	37.60	31.08	9.46	16.46	9.90	13.05	57.48	4.80	15.46
6	Leaf breadth (cm)	10.80	19.05	15.12	2.01	4.93	9.37	14.69	40.68	1.86	12.31
7	Leaf weight (g)	89.65	340.50	213.02	4030.66	4915.76	29.80	32.91	81.99	118.43	55.59
8	Stalk length (cm)	2.55	5.20	3.27	0.10	0.37	9.92	18.66	28.22	0.35	10.85
9	Stalk weight (g)	13.45	36.25	25.18	19.69	34.58	17.62	23.35	56.94	6.90	27.39
10	Curd depth (cm)	3.30	6.55	4.48	0.24	0.49	11.04	15.67	49.64	0.72	16.02
11	Curd diameter (cm)	4.75	10.30	8.28	1.54	2.43	15.01	18.81	63.64	2.04	24.67
12	Curd size (cm^2)	16.60	54.25	38.34	84.34	98.71	23.95	25.91	85.45	17.49	45.61
13	Net curd weight (g)	70.35	250.65	170.05	1777.47	2139.30	24.79	27.20	83.09	79.16	46.56
14	Net plot yield ($kg/6m^2$)	4.43	12.81	9.21	3.80	5.51	21.18	25.49	69.05	3.34	36.26
15	Yield/hectare (tons)	5.47	15.82	11.33	6.41	8.21	22.34	25.29	78.04	4.61	40.66
16	Protein (g/100g fresh weight)	0.34	1.20	0.69	0.04	0.04	27.47	27.63	98.81	0.39	56.25
17	Vitamin-C(mg/ 100g fresh weight)	29.20	78.50	54.79	161.66	180.86	23.21	24.55	89.39	24.76	45.20
18	Marketable curd weight (g)	147.50	464.50	321.81	4683.66	6764.24	21.27	25.56	69.24	117.31	36.45

Table 2: Phenotypic correlations among 18 different characters of 51 genotypes of early cauliflower

Characters	DCI	DCM	PW	LN	LL	LB	LW	SL	SW	CD	C Dia.	CS	NCW	NPY	Y/ha.	Pr.	Vit. C	MCW
DCI	1.000	0.473**	0.015	0.205	0.336*	0.171	0.078	-0.261	0.144	0.027	-0.164	-0.133	-0.104	0.044	0.031	-0.325*	0.047	0.002
DCM		1.000	-0.29*	-0.040	0.075	-0.028	-0.226	-0.273	-0.099	-0.271	-0.466**	-0.396**	-0.406**	-0.269	-0.276*	-0.336*	-0.082	-0.306*
PW			1.000	0.728**	0.566**	0.535**	0.940**	0.081	0.438**	0.548**	0.733**	0.776**	0.867**	0.874**	0.876**	0.046	-0.040	0.925**
LN				1.000	0.533**	0.413**	0.767**	0.004	0.308*	0.364**	0.416**	0.418**	0.494**	0.598**	0.610 **	-0.040	-0.105	0.616**
LL					1.000	0.758**	0.584**	-0.024	0.222	0.358**	0.334*	0.346*	0.436**	0.548**	0.527**	-0.344*	0.062	0.539**
LB						1.000	0.505**	-0.040	0.066	0.343*	0.392**	0.368**	0.499**	0.558**	0.544**	-0.163	0.102	0.533**
LW							1.000	0.056	0.369**	0.509**	0.565**	0.622**	0.719**	0.753**	0.752 **	-0.005	-0.083	0.789**
SL								1.000	0.410**	0.067	0.156	0.146	0.131	0.055	0.060	0.119	-0.043	0.061
SW									1.000	0.200	0.323*	0.323*	0.402**	0.336*	0.344 *	-0.040	-0.027	0.363**
CD										1.000	0.478**	0.661**	0.546**	0.509**	0.468 **	0.178	0.018	0.521**
C Dia.											1.000	0.884**	0.830**	0.757**	0.775 **	0.101	0.090	0.763**
CS												1.000	0.856**	0.763**	0.774	0.141	0.089	0.804**
NCW													1.000	0.871**	0.883**	0.093	0.060	0.892**
NPY														1.000	0.964**	-0.050	0.185	0.908**
Y/ha.															1.000	-0.029	0.176	0.884**
Pr.																1.000	-0.060	0.047
Vit. C																	1.000	-0.003
MCY																		1.000

DCI = Days to 50% curd initiation; LB = leaf breadth; C Dia. = Curd diameter;Pr. = Protein;DCM = Days to 50% curd maturity ; LW = leaf weight ; CS = Curd size; Vit. C = Vitamin-C; PW = Plant weight ;SL = Stalk length; NCW = Net curd weight;MCW = Marketable curd weight;LN = Leaf number;SW = Stalk weight ;NPY = Net plot yield;LL = Leaf length;CD = Curd depth;Y/ha. = yield/hectare

Table 3: Genotypic correlations among 18 different characters of 51 genotypes of early cauliflower

Characters	DCI	DCM	PW	LN	LL	LB	LW	SL	SW	CD	C Dia.	CS	NCW	NPY	Y/ha.	Pr.	Vit. C	MCW
DCI	1.000	0.882**	0.024	0.280*	0.564**	0.369**	0.123	-0.613**	0.199	0.034	-0.380**	-0.202	-0.208	0.024	-0.009	-0.389**	0.067	-0.027
DCM		1.000	-0.351*	0.068	0.457**	0.352*	-0.244	-0.583**	-0.002	-0.260	-0.539**	-0.535**	-0.604**	-0.334*	-0.361**	-0.549**	-0.089	-0.445**
PW			1.000	0.903**	0.670**	0.695**	0.978**	0.200	0.621**	0.694**	0.847**	0.809**	0.933**	0.931**	0.952**	0.063	-0.043	0.985**
LN				1.000	0.780**	0.628**	0.999**	-0.226	0.521**	0.469**	0.486**	0.459**	0.623**	0.690**	0.712**	-0.035	-0.176	0.781**
LL					1.000	0.816**	0.699**	-0.052	0.333*	0.376**	0.167	0.338*	0.490**	0.665**	0.636**	-0.450**	0.078	0.668**
LB						1.000	0.650**	-0.313*	0.134	0.320*	0.292*	0.420**	0.661**	0.742**	0.728**	-0.237	0.100	0.739**
LW							1.000	0.161	0.590**	0.659**	0.713**	0.679**	0.835**	0.850**	0.866**	0.008	-0.090	0.931**
SL								1.000	0.587**	0.024	0.407**	0.312*	0.328*	0.037	0.037	0.199	0.003	0.156
SW									1.000	0.330*	0.444**	0.478**	0.538**	0.537**	0.563**	-0.071	0.006	0.553**
CD										1.000	0.625**	0.769**	0.712**	0.574 **	0.638**	0.247	-0.011	0.687**
C Dia.											1.000	1.014**	0.953**	0.870**	0.894**	0.138	0.081	0.887**
CS												1.000	0.912**	0.816**	0.825**	0.162	0.048	0.867**
NCW													1.000	0.972**	0.967**	0.102	0.053	0.973**
NPY														1.000	1.041**	-0.049	0.206	0.955**
Y/ha.															1.000	-0.022	0.184	0.984 **
Pr.																1.000	-0.063	0.061
Vit. C																	1.000	-0.037
MCY																		1.000

DCI = Days to 50% curd initiation; LB = leaf breadth;C Dia. = Curd diameter;Pr. = Protein;DCM = Days to 50% curd maturity;LW = leaf weight;CS = Curd size;Vit. C = Vitamin-C;PW = Plant weight;SL = Stalk length;NCW = Net curd weight ;MCW = Marketable curd weight ;LN = Leaf number;SW = Stalk weight;NPY = Net plot yield ;LL = Leaf length;CD = Curd depth;Y/ha. = yield/hectare

Table 4: Direct and indirect phenotypic effects of different yield contributing characters on marketable curd weight in early cauliflower

Characters	DCI	DCM	PW	LN	LL	LB	LW	SL	SW	CD	C Dia.	CS	NCW	NPY	Y/ha.	Pr.	Vit. C	Correlation with yield
DCI	0.049	-0.023	0.018	0.004	0.030	-0.006	-0.047	-0.002	-0.013	-0.002	0.020	-0.017	-0.014	0.022	-0.010	-0.005	-0.003	0.002
DCM	0.023	-0.049	-0.355	-0.001	0.007	0.001	0.136	-0.002	0.009	0.020	0.056	-0.051	-0.053	-0.135	0.088	-0.005	0.005	-0.306*
PW	0.001	0.014	1.224	0.013	0.050	-0.018	-0.567	0.001	-0.039	-0.040	-0.088	0.099	0.113	0.438	-0.280	0.001	0.002	0.925**
LN	0.010	0.002	0.891	0.017	0.047	-0.014	-0.462	0.000	-0.027	-0.027	-0.050	0.054	0.064	0.300	-0.195	-0.001	0.006	0.616**
LL	0.017	-0.004	0.693	0.009	0.089	-0.025	-0.352	0.000	-0.020	-0.026	-0.040	0.044	0.057	0.275	-0.168	-0.006	-0.003	0.539**
LB	0.008	0.001	0.655	0.007	0.068	-0.034	-0.304	0.000	-0.006	-0.025	-0.047	0.047	0.065	0.280	-0.174	-0.003	-0.006	0.533**
LW	0.004	0.011	1.150	0.013	0.052	-0.017	-0.603	0.000	-0.033	-0.037	-0.068	0.080	0.094	0.378	-0.240	0.000	0.005	0.789**
SL	-0.013	0.013	0.099	0.000	-0.002	0.001	-0.034	0.007	-0.036	-0.005	-0.019	0.019	0.017	0.028	-0.019	0.002	0.002	0.061
SW	0.007	0.005	0.536	0.005	0.020	-0.002	-0.222	0.003	-0.088	-0.015	-0.039	0.041	0.052	0.168	-0.110	-0.001	0.002	0.363**
CD	0.001	0.013	0.671	0.006	0.032	-0.012	-0.307	0.001	-0.018	-0.073	-0.057	0.085	0.071	0.255	-0.150	0.003	-0.001	0.521**
C Dia.	-0.008	0.023	0.897	0.007	0.030	-0.013	-0.341	0.001	-0.029	-0.035	-0.120	0.113	0.108	0.380	-0.248	0.002	-0.005	0.763**
CS	-0.007	0.019	0.950	0.007	0.031	-0.012	-0.375	0.001	-0.029	-0.048	-0.106	0.128	0.112	0.383	-0.247	0.002	-0.005	0.804**
NCW	0.005	0.020	1.061	0.009	0.039	-0.017	-0.433	0.001	-0.036	-0.040	-0.099	0.110	0.130	0.437	-0.282	0.002	-0.003	0.892**
NPY	-0.002	0.013	1.070	0.010	0.049	-0.019	-0.454	0.000	-0.030	-0.037	-0.091	0.098	0.114	0.501	-0.308	-0.001	-0.010	0.908**
Y/ha.	-0.002	0.013	1.072	0.011	0.047	-0.018	-0.453	0.000	-0.030	-0.034	-0.093	0.099	0.115	0.483	-0.319	-0.001	-0.010	0.884**
Pr.	0.016	0.016	0.056	-0.001	-0.031	0.006	0.003	0.001	0.004	-0.013	-0.012	0.018	0.012	-0.025	0.009	0.016	0.003	0.047
Vit. C	-0.002	0.004	-0.049	-0.002	0.006	-0.003	0.050	0.000	0.002	-0.001	-0.011	0.011	0.008	0.093	-0.056	-0.001	-0.056	-0.003

Note: Figures in bold are direct effects; Residual effect = 0.2361; DCI = Days to 50% curd initiation;LB = leaf breadth;C Dia. = Curd diameter;Pr. = Protein; DCM = Days to 50% curd maturity;LW = leaf weight ; CS = Curd size;Vit. C = Vitamin-C; PW = Plant weight ;SL = Stalk length;NCW = Net curd weight;MCW = Marketable curd weight ; LN = Leaf number; SW = Stalk weight;NPY = Net plot yield;LL = Leaf length;CD = Curd depth;Y/ha. = yield/hectare

Table 5: Direct and indirect genotypic effects of different yield contributing characters on marketable curd weight in early cauliflower

Characters	DCI	DCM	PW	LN	LL	LB	LW	SL	SW	CD	C Dia.	CS	NCW	NPY	Y/ha.	Pr.	Vit. C	Correlation with yield
DCI	-0.534	-0.455	0.016	0.264	0.179	0.071	-0.155	0.306	0.113	-0.008	0.530	-0.344	-0.090	-0.002	0.005	0.067	0.007	-0.030
DCM	-0.470	-0.517	-0.286	0.066	0.147	0.067	0.310	0.291	0.000	0.066	0.754	-0.930	-0.256	0.039	0.184	0.094	-0.009	-0.450**
PW	-0.011	0.181	0.818	0.850	0.214	0.134	-1.266	-0.100	0.350	-0.175	-1.186	1.395	0.397	-0.110	-0.486	-0.010	-0.004	0.990**
LN	-0.150	-0.036	0.737	0.944	0.249	0.121	-1.292	0.115	0.294	-0.120	-0.684	0.792	0.265	-0.082	-0.363	0.007	-0.017	0.780**
LL	-0.299	-0.238	0.548	0.736	0.320	0.157	-0.904	0.025	0.186	-0.097	-0.237	0.585	0.209	-0.079	-0.328	0.077	0.008	0.670**
LB	-0.198	-0.181	0.573	0.595	0.262	0.191	-0.840	0.156	0.073	-0.081	-0.405	0.723	0.282	-0.088	-0.374	0.041	0.010	0.740**
LW	-0.064	0.124	0.802	0.944	0.224	0.124	-1.292	-0.080	0.333	-0.168	-0.991	1.171	0.359	-0.101	-0.445	-0.002	-0.009	0.930**
SL	0.326	0.300	0.164	-0.217	-0.016	-0.059	-0.207	-0.502	0.333	-0.005	-0.572	0.534	0.141	-0.005	-0.021	-0.034	0.000	0.160
SW	-0.107	0.000	0.507	0.491	0.106	0.025	-0.762	-0.296	0.565	-0.084	-0.614	0.826	0.231	-0.064	-0.287	0.012	0.001	0.550**
CD	-0.016	0.134	0.565	0.444	0.122	0.061	-0.853	-0.010	0.186	-0.254	-0.879	1.326	0.303	-0.067	-0.328	-0.043	-0.001	0.690**
C Dia.	0.203	0.279	0.696	0.463	0.054	0.056	-0.917	-0.206	0.249	-0.160	-1.396	1.739	0.406	-0.103	-0.456	-0.024	0.008	0.890**
CS	0.107	0.279	0.663	0.434	0.109	0.080	-0.878	-0.156	0.271	-0.196	-1.410	1.722	0.389	-0.097	-0.425	-0.027	0.005	0.870**
NCW	-0.112	0.310	0.761	0.585	0.157	0.126	-1.085	-0.166	0.305	-0.181	-1.326	1.567	0.427	-0.115	-0.497	-0.017	0.005	0.970**
NPY	0.010	0.171	0.761	0.651	0.214	0.142	-1.098	-0.020	0.305	-0.145	-1.214	1.412	0.414	-0.118	-0.532	0.009	0.020	0.960**
Y/ha.	-0.005	0.186	0.778	0.670	0.205	0.140	-1.124	-0.020	0.316	-0.163	-1.242	1.429	0.414	-0.123	-0.512	0.003	0.017	0.980**
Pr.	-0.208	0.284	0.049	-0.038	-0.144	-0.046	-0.013	-0.100	-0.040	-0.064	-0.195	0.276	0.043	0.006	0.010	-0.171	-0.006	0.060
Vit. C	0.038	0.047	-0.033	-0.170	0.026	0.019	0.116	0.000	0.006	0.003	-0.112	0.086	0.021	-0.025	-0.092	0.010	0.095	-0.040

Note: Figures in bold are direct effects; Residual effect = 0.2131 ; DCI = Days to 50% curd initiation;LB = leaf breadth;C Dia. = Curd diameter ;Pr. = Protein;DCM = Days to 50% curd maturity;LW = leaf weight;CS = Curd size;Vit. C = Vitamin-C; PW = Plant weight;SL = Stalk length;NCW = Net curd weight;MCW = Marketable curd weight;LN = Leaf number;SW = Stalk weight ; NPY = Net plot yield;LL = Leaf length;CD = Curd depth;Y/ha. = yield/hectare curd weight, marketable curd weight and yield per hactare in cauliflower.

High and moderate heritability coupled with low genetic gain (< 10%) has been observed for characters like days to 50 per cent curd initiation and maturity which indicates that these characters governed by the non additive gene action and the selection based on phenotypic appearance will not be effective and could be exploited by heterosis breeding. In cauliflower Mahajan and Gill (1997) reported similar results.

In general, genotypic correlation coefficients were higher than phenotypic values which may be ascribed to the low effect of environment on the character association and is presented in Table 2 and 3. In the present study marketable curd weight recorded a positive and significant association with plant weight, leaf number, leaf length, leaf breadth, leaf weight, stalk weight, curd depth, curd diameter, curd size and net curd weight at both genotypic and phenotypic level. This indicates that selection based on these characters will be effective in improving the marketable curd weight in cauliflower. Mahesh *et al*. (2011) and Singh *et al*. (2014b) revealed that yield had highly significant and positive correlation with all the ancillary characters *viz*., curd depth, curd diameter, weight of curd, plant height and weight of plant in cauliflower.

Marketable curd weight exhibited positive and non-significant correlation with stalk length and protein at both at phenotypic and genotypic level indicating selection based on these characters in positive direction will improve yield. However, marketable curd weight exhibited a negative and significant correlation with days to 50 per cent curd maturity at genotypic and phenotypic level indicating high values of these parameters will reduce the marketable curd weight.

Path coefficient analysis was worked out at phenotypic and genotypic level to study the effects of various horticultural traits. The results obtained for horticultural traits (Table 4 and 5) indicated that plant weight, leaf number, leaf length, curd size and net curd weight have recorded positive direct effect on marketable curd weight both at genotypic and phenotypic levels indicating the importance of these characters during selection for the improvement of marketable curd weight in cauliflower. These results are in conformity with the Reddy and Varalakshmi (1995) in cauliflower.

Partitioning of correlation values showed that some of the characters could not produce significant correlation with marketable curd weight which might be either due to very high negative direct effects. Critical analysis of results obtained from character association and path analysis indicated that the plant and leaf parameters like, plant weight, leaf number, leaf length, and curd parameters like, curd size and net curd weight possessed both positive association and high positive direct effects. Hence, selection for these traits could bring improvement in yield and yield components

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