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GENETIC VARIABILITY AND CORRELATION IN CHRYSANTHEMUM (*Chrysanthemum morifolium* Ramat) GENOTYPES

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ABSTRACT : Evaluation of diversity through genetic variability and correlation studies on vegetative and floral characters of chrysanthemumgenotypes were undertakenat experimental farm, Department of Horticulture, NEHU, Tura Campus, Tura, West Garo Hills District,Meghalaya during 2015-2017.Fifteen varieties namely, Korean Red, Korean Yellow, SolanShringar, Ramblored, Yellow Star, Calabria, Ajay, AAU Yellow, White Star, Korean Bicolour, Charming, Lysid, Safin, Shayana and Gambit were selected for their evaluation.The range of variation was high for number of leaves (38.24-125.11) followed by days to bud initiation (34.60-94.66). Highest phenotypic and genotypic variances were observed for number of leaves (699.74 and 699.70), respectively. The estimates of phenotypic coefficient of variation (PCV) were higher than genotypic coefficient of variation (GCV) for all the traits. Maximum PCV and GCV was observed for dry weight (89.73 and 89.17) followed by number of flowers per spray per plant (78.10 and 78.08).However, maximum heritability were observed in number of leaves (99.98 percent), number of flowers per spray per plant (99.98 percent) and flower longevity (99.97 percent) followed by days to bud initiation (99.95 per cent) and plant height (99.94 percent), whereas, maximum genetic advance was noticedin number of leaves (54.49). The high heritability with genetic advance as percentage of mean for number of branchesand number of flowers per spray per plant indicates the possible role of additive gene action. The magnitude of genotypic correlation was higher than their corresponding phenotypic correlation for most of the traits, indicating a strong inherent linkage between various traits under study. At genotypic and phenotypic level, number of leaves exhibited highly significant and positive correlation with number of branches (0.889), number of flower head per plant (0.498), number of sprays per plant (0.497) and number of flowers per spray per plant (0.419), while, vase life showed significant and positive correlation with number of flower head per plant (0.315), number of sprays per plant (0.339) and flower diameter (0.311).

Keywords : *Chrysanthemum, genetic variability, heritability, genetic advance, correlation*

Chrysanthemum (*Chrysanthemum morifolium* Ramat) is a popular flower crop used for cut flower, loose flower, garland making, garden display, pot plant, etc.It occupies prime position among commercial flower crops which has high demand in both domestic and international market. Chrysanthemum is very rich in varietal wealth and every year there is an addition of new varieties. Chrysanthemum flowers are highly priced for its vast range of shape and sizes of flowers and ranges of colours. The fresh chrysanthemum flowers demand has steadily increased not only for decoration but also for many other purposes like essential oils, cosmetics, aroma therapy, dry flowers, pot pourries, natural dyes, medicines etc. West Garo Hills District, Meghalaya is agro-climatically very much suited for growing Chrysanthemum throughout the year. However, performance of cultivars is also influenced by agro-climatic factors. The variations among chrysanthemum varieties are large in response to environment particularly temperature and the interaction between temperature and cultivar occur for every developmental trait (Pleog and Hauvelink, 29).

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A huge quantum of variability exists in this crop with respect to shape, size, growth habit, flowering behaviour, vase life etc. Various workers evaluated different cultivars/hybrids of chrysanthemum under different regions (Kumar, 17; Negi *et al.,* 26; Dewan *et al.*, 11; Singh *et al.,* 32).In spite of such variability, very few are having desirable characters for yield, vase life and flower quality. So, there is an urgent need for selection as well as maintenance of good germplasm. The interrelationship of various characters in the form of correlation is an important aspect in crop breeding. Knowledge of correlation studies helps the plant breeder to ascertain the components of yield and provide an effective basis of selection. The characters contributing significantly to desirable traits can be significantly identified and used as alternate selection criteria in crop improvement programme. For effective breeding programme, knowledge of the mean performance, magnitude of genetic variability, heritability and genetic advance is essential. Heritability gives a measure of transmission of characters from one generation to the other, enabling a plant breeder in isolation of elite selection in the crop. Genotypic and phenotypic coefficient of variation, heritability and genetic advance constitute the important genetic parameters which frequently applied in plant breeding for crop improvement. Genetic parameters like genotypic coefficient of variation (GCV), phenotypic coefficient of variation (PCV), heritability and genetic advance are useful biometrical tools for determination of genetic variability (Aditya *et al.* 1).Coefficient of variation allows meaningful comparison of the variation of several traits of plants belonging to the same population as well as a comparison of the variation of same trait as expressed by different population. Heritability tells us about the additive genetic variance and phenotypic variance (Nyquist 27). Now a day, climatic condition of north eastern region is highly variable due to climate change and introduced varieties vary in performance. The performance of any crop or variety extensively depends on genotypic and environmental interaction. As a result, cultivars which perform well in one region may not perform same in other regions of varying climatic conditions. Therefore, it becomes essential to develop varieties suited to specific climatic condition which can be further utilized for genetic improvement of chrysanthemum. However, no systematic efforts were made in the past to identify the suitable genotypes of chrysanthemum for cut flower production and crop improvement programme under agro-climatic condition of Tura, Meghalaya. Hence, the present study on different varieties was undertaken to assess their genetic variability, heritability, genetic advance, correlation coefficient and suitability in crop improvement under agro-climatic conditions of Tura,West Garo Hills district, Meghalaya.

MATERIALS AND METHODS

Study area and statistical method

An experiment was conducted at experimental farm, Department of Horticulture, North Eastern Hill University, Tura, Meghalaya from July 2015 to March 2017. The district is situated approximately between the latitudes 90° 30' and 89° 40' E and the longitudes of 26° and 25° 20' N.It has an average elevation of 349 metres (1145 feet).The prevailing weather of the region is sub-tropical, experiences a relatively high temperature in summer and cool winters. The average rainfall is 3300mm of which more than two-thirds occur during the monsoon, winter being practically dry.The experiment was laid out in randomized block design with fifteen treatments and three replications.Fifteen varieties namely, Korean Red, Korean Yellow, Solan Shringar, Ramblored, Yellow Star, Calabria, Ajay, AAU Yellow, White Star, Korean Bicolour, Charming, Lysid, Safin, Shayana and Gambit were selected for their evaluation. The experiment was conducted in pots using soil and well decomposed FYM (1:1). The chrysanthemum plants of the respective varieties were raised in nursery through terminal stem cuttings in portrays filled with riverbed sand in the month of July, 2015 and 2016. Afterwards, well rooted cuttings of chrysanthemum were transferred in polybags with similar potting mixture used for entire experimentation. The well-established rooted varieties of chrysanthemum were transplanted in pots during second fortnight of August, 2015 and 2016. Uniform package of practices were followed throughout the experiment to grow the healthy crop. Routine inter cultural operations were done as per the requirement. Observations were recorded for plant height,number of leaves,number of branches, leaf length,leaf breadth, leaf area,stem diameter, Days to bud initiation, number of flower head per plant, number of sprays per plant, number of flowers per spray per plant, flower diameter, flower longevity, dry weight of flower and vase life.The data collected were pooled and analyzed statistically. Phenotypic and genotypic coefficient of variation was calculated as per formula described by Burton (8) and Burton and De Vane (9). Heritability in broad sense was worked out according to formula suggested by Allard (3) and genetic advance as per cent of mean was calculated following method by Johnson *et al.* (14). Phenotypic and genotypic correlation was computed as suggested by Al Jibouri *et al.* (2).

RESULTS AND DISCUSSION

Mean performance, phenotypic coefficient of variation (PCV), genotypic coefficient of variation (GCV), heritability, genetic advance and genetic gain

The extent of variability with respect to fifteen quantitative characters in fifteen chrysanthemum genotypes were measured in terms of mean performance, phenotypic coefficient of variation (PCV), genotypic coefficient of variation (GCV), heritability, genetic advance and genetic gain are presented in Table 1. The range of variation was high for number of leaves (38.24-125.11) followed by days to bud initiation

(34.60-94.66), respectively. Highest range for number of leaves in spray chrysanthemum was also noticed by Misra *et al.,* 24. Highest phenotypic and genotypic variances were also observed for number of leaves (699.74-699.70) followed by days to bud initiation (342.33 and 342.33) and leaf area (90.62 and 64.87) at both the level, respectively, while lowest were observed for dry weight of flower (0.11 and 0.01) at phenotypic and genotypic level, respectively. Maximum phenotypic coefficient of variation was observed in dry weight of flower (89.73) followed by number of flowers per spray per plant (78.10) and number of branches at 105 days (55.51), while, minimum was recorded in vase life (19.71). Maximum genotypic coefficient of variation was in dry weight of flower (89.17) followed by number of flowers per spray per plant (78.08) and number of branches (55.41) and minimum was in leaf breadth (18.97). The phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) was the highest for number of flowers per spray per plant, suggesting that this character is under genetic control. Hence, these characters can be relied upon selection for further improvement. The phenotypic coefficient of variation (PCV) was higher than genotypic coefficient of variation (GCV) for all the characters under study, indicating the role of environment in expression of genotype. Similar results were also reported by Sheela *et al.* (31) in heliconia.Maximum heritability was recorded for number of flowers per spray per plant (99.98) and number of leaves (99.98) followed by flower longevity (99.97) and days to bud initiation (99.95). The heritability showed the possibility of effective base on the phenotypic expression. High heritability estimates in broad sense for number of flowers per plant, flower diameter and plant height in chrysanthemum were also noticed by Kumar *et al.* (21).

The maximum genetic advance was recorded in number of leaves (54.49), however, the minimum genetic advance was observed in dry weight of flower (0.20). High heritability associated with high genetic advance proves more useful for efficient improvement of a character through selection. The high genetic advance percentage of mean for number of flowers per spray per plant (99.79) indicating the possible role of additive gene action.High heritability with high genetic advance was observed for number of florets per spikein tuberose by Ranchana *et al.* (30). Genetic advance as percent of mean were also observed high for number of flowers per plant in chrysanthemum (Kumar *et al.,*19).The high heritability was associated with high genetic advance percentage of mean for number of flowers per spray per plant indicating the possible role of additive gene action and could be effectively improved through selection. These results corroborate with the findings of Kumar *et al.* (20) in chrysanthemum.However, the estimate of heritability was high with low genetic advance for dry weight of flower (98.76, 0.20), stem diameter (68.32, 0.98) and leaf breadth (77.11, 1.39), which indicated that high heritability was due to non-additive gene effects and influence of environment. Hence, there is a limited scope for selection. The magnitude of genotypic correlation was higher than their corresponding phenotypic correlation for most of the traits, indicating a strong inherent linkage between various traits under study (Kumar, 18). PCV was higher than GCV for all the characters, indicating the role of environment in the expression of genotypes. Higher PCV than GCV has also been reported for various traits in gerbera Kumari *et al* (22) and Kumar *et al* (16). The magnitude of heritable variability is the most important aspect of genetic constitution of the genotype which has close bearing on the response to selection Panse (28). Similar results were also reported by Chobe *et al.* (10) and Kumari *et al* (22). High heritability and high genetic advance for number of leaves per plant by Anirban and Dastidar (4), Dewey and Lu (12), leaf breadth by Kumar *et al.* (16) and disc diameter and stalk length by Anuradha and Gowda (6) have also been reported. The PCV exhibited nearby similar trend for the traits as in GCV and had higher value than GCV indicating that genotypic expression was superimposed by the environmental influence and hence selection may be misleading. Similar findings were reported in marigold by Namita *et al.* (25) and Singh and Singh (33).

Correlation coefficient analysis

Correlation measures the degree of association between the characters. Information on correlation between the important economic traits are of considerable help in the selection programme, because correlation ensures simultaneous improvement in one or two or more variables and negative correlations bring out the need to obtain a compromise between the desirable traits. The analysis of variance revealed significant variation among all the fifteen genotypes of chrysanthemum for all fifteen attributes (Table 2 and 3). In general, phenotypic correlations are smaller than genotypic correlation. This could occur when genes governing two traits are similar and environmental conditions pertaining to the expression of these traits have small and similar effects. A positive correlation between desirable characters is favorable to the plant breeder because it helps in simultaneous improvement of both the characters. High positive correlation between the traits

Table 1 : Estimates of variance, coefficient of variation, heritability, genetic advance and genetic gain for different characters of chrysanthemum varieties

Characters	Range	General mean	Variance (σ^2)		Coefficient of variation		Heritability (Broad sense) %	Genetic advance (GA)	Genetic advance as per cent of mean (GA)
			Phenotypic ($\sigma^2 p$)	Genotypic ($\sigma^2 g$)	PCV (%)	GCV (%)			
Plant height	10.48-49.66	28.63	112.16	112.15	36.99	36.97	99.94	21.81	76.19
Number of leaves	38.24-125.11	72.17	699.74	699.70	36.65	36.65	99.98	54.49	75.50
Number of branches	2.13-12.51	5.83	10.47	10.44	55.51	55.41	99.91	6.64	98.93
Leaf length	3.27-7.50	5.11	1.21	1.07	21.54	20.20	87.92	1.99	39.02
Leaf breadth	2.63-6.17	4.05	0.76	0.59	21.60	18.97	77.11	1.39	34.32
Leaf area	9.51-46.08	21.24	90.62	64.87	44.81	37.91	71.59	14.04	66.08
Stem diameter	1.30-3.75	2.68	0.49	0.33	26.04	21.52	68.32	0.98	36.64
Days to bud initiation	34.60-94.66	68.88	342.33	342.33	28.86	28.86	99.95	38.11	55.34
Number of flower head/plant	5.67-33.35	13.08	38.59	38.56	47.66	47.64	99.64	12.79	98.09
Number of sprays/plant	3.47-16.29	8.21	9.26	9.23	37.08	37.01	99.64	6.25	76.10
Number of flowers/spray per plant	1.33-17.06	4.83	14.21	14.20	78.10	78.08	99.98	7.76	99.79
Flower diameter	3.23-8.47	5.05	1.92	1.91	27.49	27.37	99.08	2.83	56.11
Flower longevity	12.33-24.73	18.33	14.72	14.72	20.93	20.93	99.97	7.90	98.55
Dry weight of flower	0.03-0.43	0.11	0.01	0.01	89.73	89.17	98.76	0.20	43.11
Vase life	4.40-9.44	6.84	1.82	1.78	19.71	19.54	98.23	2.73	39.89

indicates that selection for improvement of one character leads to the simultaneous improvement in the other characters depending upon the magnitude of association between them. The characters are considered to be independent when weak correlation exists between them and selection for a character may not affect the other (Falconer, 13). Whereas, genotypic correlation provides a measure of genetic association between characters and is generally used in selection for one character as a measure of improving another. The genotypic correlation in the true sense may be interpreted as the correlation of breeding value. The magnitude of genotypic correlation was higher than their corresponding phenotypic correlation for most of the traits, indicating thereby, a strong inherent linkage between various traits under study. Similar trend has been observed by Anuradha (5) in gerbera for most of the characters; these findings indicate that though there is strong inherent association between various characters, the phenotypic expression is reduced under the influences of environment. In some cases, phenotypic and genotypic correlations were very close indicating less environmental influences. Anuradha and Gowda (7) and Magar *et al.* (23) have also reported higher genotypic correlation coefficient than phenotypic correlation coefficient among the various traits in gerbera and Ranchana *et al.* (30) in tuberose.

Genotypic level

At genotypic level, plant height (Table 2) exhibited highly significant positive correlation with number of leaves (0.530), leaf length (0.449) and significant positive correlation with leaf breadth (0.315), leaf area (0.318), number of flower head per plant (0.332), number of sprays per plant (0.312) and number of flower per sprays per plant (0.295). Plant height exhibited positive correlation with number of leaves per plant in tuberose (Ranchana *et al.,* 30).However, number of leaves was highly significant and positively correlated with number of branches (0.889), number of flower head per plant (0.498), number of spray per plant (0.497) and number of flowers per spray per plant (0.419) and attained significant negative correlation with stem diameter (-0.300) and vase life (-0.343).

Number of branches showed highly significant and positive correlation with number of leaves (0.889), stem diameter (0.456), number of flower head per plant (0.453) and number of flowers per spray per plant (0.466) and significant positive correlation in number of sprays per plant (0.349), while,significant negative correlation with dry weight of flower (-0.335) and vase life (-0.306). Highly significant and positive association of number of branches with number of leaves in spray chrysanthemum was also reported by Misra *et al.* (24).

Leaf length showed highly significant and positive correlation with leaf breadth (0.912), number of flower head per plant (0.452), number of sprays per plant (0.528) and significant positive correlation with days to bud initiation (0.356) and number of flowers per spray per plant (0.319), whereas, highly significant negative correlation with vase life (-0.386). However, Leaf breadth was highly significant and positively correlated with leaf area (0.982), days to bud initiation (0.552) and number of sprays per plant (0.420). Positive and significant genotypic correlation of number of flowers per plant with number of branches per plant and leaf length in chrysanthemum was also noticed by Kumar *et al.* (21).

Leaf area exhibited highly significant positive correlation with days to bud initiation (0.436) and significant positive correlation with number of spray per plant (0.377) and showed highly significant negative correlation with vase life (-0.402). Whereas, stem diameter showed highly significant and positive correlation with days to bud initiation (0.483) and positive correlation with flower longevity (0.361) and highly significant negative correlation with number of flowers per spray per plant (-0.480), number of flower head per plant (-0.450) and significant negative correlation with number of sprays per plant (-0.323).

Significant and positive correlation was noticed in days to bud initiation with flower diameter (0.374), while it was negatively correlated with number of flowers per spray per plant (-0.311). Whereas, number of flower head per plant had highly significant and positive correlation with number of sprays per plant (0.890), number of flowers per spray per plant (0.930) and flower diameter (0.396) and significant positive correlation with vase life (0.315). Number of spray per plant showed highly significant and positive correlation

Table 2 : Inter character association (genotypic correlation) between different chrysanthemum varieties.

Characters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	0.530**	0.160	0.449**	0.315*	0.318*	0.271	0.283	0.332**	0.312*	0.295*	0.274	0.148	0.253	–0.174
2		1	0.889**	0.367*	0.167	0.169	–0.300*	0.207	0.498**	0.497**	0.419**	0.148	0.126	–0.217	–0.343*
3			1	0.169	–0.053	–0.016	0.456**	0.002	0.453**	0.349*	0.466**	0.043	–0.006	–0.335*	–0.306*
4				1	0.912**	0.019	–0.047	0.356*	0.452**	0.528**	0.319*	0.143	0.041	–0.169	–0.386**
5					1	0.982**	0.187	0.552**	0.227	0.420**	0.036	0.081	0.085	–0.156	–0.261
6						1	0.018	0.436**	0.265	0.377*	0.133	0.046	–0.064	–0.238	–0.402**
7							1	0.483**	–0.450**	–0.323*	–0.480**	–0.082	0.361*	0.240	0.153
8								1	–0.163	0.052	–0.311*	0.374*	0.209	–0.058	–0.241
9									1	0.890**	0.930**	0.396**	–0.012	0.035	0.315*
10										1	0.660**	0.363*	0.152	0.001	0.339*
11											1	0.359*	–0.143	0.057	0.245
12												1	0.347*	0.650**	0.311*
13													1	0.590**	0.188
14														1	0.451**
15															1

Characters 1. Plant height, **2.** Number of leaves, **3.** Number of branches, **4**. Leaf length, **5**. Leaf breadth, **6**. Leaf area, **7**. Stem diameter, **8**. Days to bud initiation, **9**. Number of flower head/plant, **10.**Number of sprays/plant, **11**. Number of flowers/spray/plant, **12**. Flower diameter, **13**. Flower longevity, **14**. Dry weight of flower, **15**. Vase life.

with number of flowers per spray per plant (0.660) and significant positive correlation with flower diameter (0.363) and vase life (0.339). Number of flowers per spray per plant attained significant and positive correlation with flower diameter (0.359), while, flower diameter had significant positive correlation with flower longevity (0.347) and vase life (0.311) and highly significant and positive correlation with dry weight (0.650). However, highly significant and positive correlation was observed in flower longevity with dry weight (0.590) and dry weight had highly significant and positive correlation with vase life (0.451).

Phenotypic level

At phenotypic level, plant height (Table 3) was highly significant and positively correlated with number of leaves (0.531) and leaf length (0.421), whereas, it had significant positive correlation with number of flower head per plant (0.332), number of sprays per plant (0.312) and number of flowers per spray per plant (0.295). Highly significant and positive correlations for plant height with number of leaves were also reported by Ranchana *et al.* (30) in tuberose.However, highly significant and positive correlation of number of leaves with number of branches (0.888), number of flower head per plant (0.497), number of sprays per plant (0.496) and number of flowers per spray per plant (0.419), while, positive correlation with leaf length (0.344) and negative correlation with vase life (-0.340) was observed.

Number of branches was highly significant and positively correlated with number of flower head per plant (0.453) and number of flowers per spray per plant (0.465) while, significant positive correlation with number of sprays per plants (0.349) but highly significant and positive correlation with stem diameter (-0.384), whereas, significant and positive correlation with dry weight of flower (-0.332) and vase life (-0.298) were observed. At phenotypic level number of branches per plant showed highest direct positive effect on number of flowers per plant in chrysanthemum (Kumar *et al.,* 16).

Highly significant and positive correlation of leaf length with leaf breadth (0.780), leaf area (0.806), number of flower head per plant (0.423) and number of sprays per plant (0.492) was noticed, while, days to bud initiation (0.333) and number of flowers per spray

Table 3 : Inter character association (phenotypic correlation) between different chrysanthemum varieties.

Characters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	0.531**	0.159	0.421**	0.276	0.268	0.224	0.283	0.332**	0.312*	0.295*	0.273	0.148	0.251	–0.172
2		1	0.888**	0.344*	0.147	0.143	–0.248	0.207	0.497**	0.496**	0.419**	0.147	0.126	–0.215	–0.340**
3			1	0.159	–0.049	–0.017	–0.384**	0.002	0.453**	0.349*	0.465**	0.044	–0.006	–0.332**	–0.298**
4				1	0.780**	0.806**	0.024	0.333*	0.423**	0.492**	0.299*	0.131	0.039	–0.158	–0.360**
5					1	0.918**	0.302*	0.485**	0.198	0.366*	0.031	0.074	0.075	–0.117	–0.228
6						1	0.201	0.369*	0.222	0.314*	0.112	0.034	–0.054	–0.185	–0.340**
7							1	0.399**	–0.375*	–0.272*	–0.399**	–0.072	0.299*	0.199	0.111
8								1	–0.163	0.052	–0.311*	0.372*	0.209	–0.058	–0.239
9									1	0.889**	0.929**	0.394**	–0.012	0.036	0.314*
10										1	0.659**	0.361*	0.152	0.002	0.340*
11											1	0.358*	–0.143	0.057	0.243
12												1	0.346*	0.642**	0.308*
13													1	0.586**	0.186
14														1	0.446**
15															1

Characters 1. Plant height **2.** Number of leaves **3.** Number of branches **4.** Leaf length **5.** Leaf breadth **6.** Leaf area **7.** Stem diameter **8.** Days to bud initiation **9.** Number of flower head/plant **10.**Number of sprays/plant **11.** Number of flowers/spray/plant **12.** Flower diameter **13.** Flower longevity **14.** Dry weight of flower **15.** Vase life.

per plant (0.299) attained significant positive correlation and vase life (-0.360) showed significant but negative correlation. Leaf breadth had highly significant and positive correlation with leaf area (0.918) and days to bud initiation (0.485),whereas, stem diameter (0.302) and number of sprays per plant (0.366) noted significant positive correlation. Leaf area had significant positive correlation with days to bud initiation (0.369) and number of sprays per plant (0.314),but, showed significant negative correlation with vase life (-0.340). Stem diameter attained highly significant positive correlation with days to bud initiation (0.399), significant positive correlation with flower longevity (0.299),however, attained highly significant negative correlation with number of flowers per spray per plant (-0.399) and significant negative correlation with number of flower head per plant (-0.375) and number of sprays per plant (-0.272).

Days to bud initiation had significant positive correlation with flower diameter (0.372), while, significant negative correlation with number of flowers per spray per plant (-0.311). Whereas, highly significant and positive correlation of number of flower head per plant with number of sprays per plant (0.889), number of flowers per spray per plant (0.929) and flower diameter (0.394), while, significant positive correlation with vase life (0.314)were observed. Vase life exhibited positive and significant correlation with number of flower buds per plant in chrysanthemum was also reported by Vetrivel and Jawaharlal (34).

A significant positive correlation both at genotypic and phenotypic levels was also recorded between number of flower head per plant and number of branches per plant in chrysanthemum by Kameshwariet al.15.Number of sprays per plant had highly significant positive correlation with number of flowers per spray per plant (0.659) and significant positive correlation with flower diameter (0.361) and vase life (0.340). However, number of flowers per spray per plant showed significant positive correlation with flower diameter (0.358), while, flower diameter had highly significant positive correlation with dry weight of flower (0.642), whereas, significant positive correlation with flower longevity (0.346) and vase life (0.308) was noticed. Flower longevity had highly significant correlation with dry weight of flower (0.586) and dry weight of flower showed highly significant positive correlation with vase life (0.446).

The expression of desirable traits existsing a complex association with different characteristics in the plant system and the characters do not exist in isolation. Correlation measures the degree of association between these characters. In the present study, it was observed that for most of the characters genotypic correlation coefficients were higher than phenotypic correlation coefficients. There is strong inherent association between various characters; the phenotypic expression is lessened under the influence of environment. Thus, during the entire investigation on evaluation of fifteen cultivars of chrysanthemum and their genetic variability and correlation coefficient, it was observed that cultivar 'Calabria', 'Yellow Star', 'AAU Yellow', 'Gambit' and SolanShringar' may have scope for evolving noble colour and elite varieties in Tura, West Garo Hills District, Meghalaya.

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