

## GENETIC VARIABILITY AND CHARACTER ASSOCIATION IN DAHLIA

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**Abstract:** Fifteen genotypes of dahlia (*Dahlia variabilis* Desf.) were used to study the genetic variability and character association among total flower production per plant and its nine attributing traits. Genotypic differences were significant for total flower production and its components, thereby indicating the possibility of improving flower production through varietal selection in the existing collection. High GCV and heritability associated with high GA were observed for branches/plant, leaf area and total flowers/plant. Total flowers/plant showed significant positive association with span of flowering and internode length, and significant negative association with days to first flowering. For achieving maximum flower production, besides total flowers/plant, branches/plant followed by span of flowering and days to first flowering were the most important components which can be utilized in effective selection.

**Key words:** Dahlia, variability, character association.

### INTRODUCTION

In dahlia (*Dahlia variabilis* Desf.), very little work has been done to determine the degree of association between flower production and its attributing traits. The knowledge about character association is imperative for a breeder to start with any systematic improvement programme. Keeping this in view, the present

study was taken up to understand the nature of character association which in turn helps in formulating the selection criterion.

### MATERIALS AND METHODS

The present investigation was carried out during 1989-90 on 15 varieties of dahlia in a pot culture experiment with five replications.

Table 1. Genetic variability parameters in dahlia

Character	Mean	Range	Variance	GCV (%)	PCV (%)	H (%)	GA (% of mean)
Plant height, cm	70.76	52.0-97.0	784.2*	17.58	18.18	93.91	35.10
No. of branches/plant	14.17	6.0-20.0	80.3*	27.65	30.70	81.09	51.23
No. of leaves/plant	45.28	31.20-70.2	641.4*	24.81	25.81	92.43	49.14
Internode length, cm	3.92	1.56-7.56	20.7*	51.46	53.68	91.88	10.13
Stem diameter, cm	1.67	1.20-2.16	0.4*	15.98	20.59	60.23	25.15
Leaf area, cm <sup>2</sup>	147.07	68.4-201.9	7612.7*	26.38	27.98	88.88	51.59
Days to first flowering	55.73	43.0-63.0	83.1*	10.78	11.19	92.79	21.41
Dia. of first flower, cm	19.29	13.1-26.1	80.5*	26.71	21.11	96.30	41.83
Flowering duration, days	40.80	25.0-52.0	281.5*	18.30	18.75	95.21	36.76
No. of flowers/plant	8.31	2.2-19.0	150.6*	65.73	67.49	94.87	131.82

\*Significant at 1% level

Table 2. Phenotypic (P) and genotypic (G) correlation coefficients among different traits in dahlia

Characteri		Bbran- ches/ plant	Leaves/ plant	Internode length	Stem diameter	Leaf area	Days to first flowering	Diameter of first flower	Flowering duration	No. of flowers/ plant
Plant height	P	0.39	0.36	0.23	0.42	-0.33	0.11	-0.16	0.18	0.23
	G	0.46	0.40	0.25	0.05	-0.36	0.13	-0.17	0.19	0.24
No. of branches/ plant	P		0.55	-0.13	0.47	0.04	0.16	0.24	0.13	0.09
	G		0.63	-0.17	0.57	0.07	0.15	0.27	0.17	0.09
No. of leaves/ plant	P			-0.28	0.36	0.19	0.39	-0.03	0.16	-0.20
	G			-0.30	0.44	0.20	0.43	-0.03	0.17	-0.21
Internode length	P				-0.08	-0.31	-0.72**	0.03	0.22	0.51
	G				-0.16	-0.34	-0.76**	0.03	0.22	0.53*
Stem diameter	P					0.46	0.21	0.26	0.03	-0.18
	G					0.56	0.31	0.32	0.02	-0.22
Leaf area	P						0.38	-0.08	0.15	-0.33
	G						0.42	-0.10	0.15	-0.35
Days to first flowering	P							-0.35	-0.37	-0.64*
	G							-0.38	-0.33	-0.67**
Diameter of first flower	P								-0.13	-0.10
	G								-0.13	-0.12
Duration of flowering	P									0.72**
	G									0.73**

\*Significant at 5% level

A mixture of soil, compost and sand in the proportion of 5:3:1 was filled in pots of 30 cm size. A single plant was planted in each pot and fifteen pots were taken per replication per treatment. After 15 days of planting of rooted cuttings, 8 g of NPK fertilizer mixture in the form of urea, single superphosphate and muriate of potash in the proportion of 1:2:1 was applied in each pot. The pots were again top-dressed at first bud stage with same quantity of fertilizer mixture and  $MgSO_4$  @ 3 g/pot. The plants were staked 30 days after planting. Observations were recorded on plant

height, number of branches per plant, number of leaves per plant, internode length, stem diameter, leaf area, days to first flowering, diameter of first flower, duration of flowering and number of flowers per plant from five randomly selected plants per replication and the mean data were considered for analyses of variance and covariance (Panse and Sukhatme, 1967). From the variance and covariance components, coefficients of variation at phenotypic (PCV) and genotypic (GCV) levels (Burton, 1952), heritability in broad sense (H) (Lush, 1940), expected genetic advance (GA)

(Johnson *et al.*, 1955) and the genotypic and phenotypic correlation coefficients (Miller *et al.*, 1958) were computed.

## RESULTS AND DISCUSSION

Studies on variation and genetic parameters revealed that total flowers per plant and its components exhibited significant differences (Table 1), indicating the presence of sufficient genetic variability in the material. In the present study, high H with low GCV and low GA for days to first flowering indicated little scope for further improvement in selection. In the case of total flowers per plant, leaf area and branches per plant, high GCV with high H was associated with high GA indicating that it is worthwhile to select for these characters. However, high H with moderate GCV and moderate GA for leaves/plant and span of flowering indicated that improvement for these characters could be expected.

Correlation studies (Table 2) showed that for almost all the pairs, genotypic and phenotypic associations were in same direction and the genotypic estimates were higher than the corresponding phenotypic ones, indicating an inherent association between various characters. A highly significant positive association between internode length and span of flowering, and highly significant negative association between days to first flowering and total flowers/plant were observed. The posi-

tive relationship of plant height and branches/plant and negative relationship of stem diameter, leaf area, diameter of first flower with total flowers/plant were not significant.

The studies suggested that amongst the 10 traits, besides total flowers/plant, branches/plant followed by span of flowering and least number of days to first flowering were the most important components which might serve as effective selection criteria for improvement in total flower production per plant in dahlia.

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