

STUDY ON GENOTYPIC CORRELATION COEFFICIENT IN DAHLIA GERMPLASM

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ABSTRACT : Dahlia is an important bulbous flower crop which has position to increase economic earnings of growers. Forty varieties were grown and studied for genotypic correlation of 16 traits at C.S. Azad University of Agriculture and Technology, Kanpur during 2011-12 and 2012-13. Vegetative and reproductive characters were found to have considerable relationship which also indicated the scope for making improvement in dahlia. Plant height and maximum number of flower per head revealed the sustainable magnitude for crop improvement in dahlia crop.

Keywords : Dahlia, varieties, germplasm, correlation.

Dahlia is one of the important bulbous flowering crops and its flowers are used for various purposes of decoration. It belongs to the family Compositae. Dahlia has a large group of beautiful striking colours – bi-colours and multicoloured cultivars (Beura and Maharana, 3). Due to its qualities, it is advocated as a flower of glamour and perforation. It provides inner enjoyment and feelings to human beings. Among the flowers it has own rank and standing in India and abroad. Its varieties have considerable importance and scope in economic field. In recent years dahlia farming along with other flowers has picked up very well both in the hills and plains. Its flowers of giant decorative, large decorative, medium decorative, small decorative, pompon and cactus types are grown in Uttar Pradesh, Delhi, Rajasthan, Punjab, Tamil Nadu, Himanchal Pradesh, Gujarat, Karnataka, Andhra Pradesh, Sikkim, Madhya Pradesh, Kolkata, Orissa, Assam and States of North Eastern Hill region in sporadic cultivation. Some Institutions, Universities and National/Regional Centre/Research complex etc. grow it for different purposes.

MATERIALS AND METHODS

Present investigation was carried out during the year 2011-12 and 2012-13 at C.S. Azad University of Agriculture and Technology, Kanpur. The experimental material consisted 40 standard dahlia genotypes. The experiment was laid out in Randomized Block Design with three replications. All the recommended cultural practices were followed to grow the successful crop. The data collected was statistically analyzed. The genetic diversity among the genotypes was worked out using Mahalanobis D^2 statistics. Tubers of screened

and selected varieties were taken as basic material for planting in the trials. Healthy tubers were planted in proper layout in the field.

RESULTS AND DISCUSSION

A perusal of the data summarized in the Tables 1 and 2 revealed significant correlations in different characters taken under present investigations. Sprouting of tubers for raising the plant material showed positive and highly significant correlation with number of branches/plant (0.4870), number flowers/plant (0.3020), diameter of flower (0.2323), diameter of tuber (0.1349) and weight of tuber (0.2681) during 2011-12. Similarly, in the next year, this character also revealed positive and significant genotypic correlation with diameter of leaf stalk (80.3644), days for bud maturity (0.1375), length of flower bud (0.0647), number of flowers/head (0.0283) and weight of tuber (0.0392). Similar results had also been reported in gladiolus (Anuradha and Gawda, 1 & 2; Prasad and Pradhan, 7).

Plant height exhibited positive and highly significant genotypic correlation with number of leaves/plant (0.5343), days for flower bud maturity (0.2266), diameter of tuber (0.4181) and weight of tuber (0.3644), whereas this aspect also revealed positive correlation with other characters like number of branches/plant, length of branch, length of leaf, diameter of leaf stalk and diameter of flower during 2011-12. In the experiment of second year (2012-13) plant height also revealed positive and highly significant correlation with number of flowers/plant

(0.3160), diameter of flower (0.4150) and diameter of tuber (0.4549).

The plant height and number of branches/plant revealed positive and highly significant correlation with length of branch (0.8015), number of leaves/plant (0.4056), diameter of leaf stalk (0.5091), days for bud maturity (0.3062), length of flower bud (0.3128),

number of flowers/plant (0.3944), number of flowers/head (0.5779), diameter of tuber (0.3847) and weight of tuber (0.3670) during 2011-12. Number of branches also showed positive and highly significant correlation with length of branch (0.7399), number of leaves/plant (0.4934), diameter of leaf stalk (0.4602), number of flowers/ plant (0.3259), number of

Table 1: Genotypic correlation coefficient in Dahlia for 16 characters (2011-12).

Sl. No.	Characters	Days for tuber sprouting	Plant height	No. of branches /plant	Length of branch	No. of leaves/plant	Length of leaf	Diameter of leaf stalk	Days to bud emergence
		1	2	3	4	5	6	7	8
1	Days for tuber sprouting	1.0000	0.0141	0.4870**	0.2934	0.1278	-0.2641	0.0491	-0.3139
2	Plant height	0.0141	1.0000	0.1763	0.1879	0.5343***	0.0267	0.1041	-0.3271*
3	No. of branches/ plant	0.4870*	0.1763	1.0000	0.8019***	0.4056**	-0.6167***	0.5091***	0.3062*
4	Length of branch	0.2934	0.1879	0.8015***	1.0000	0.4586**	-0.5683***	0.551***	0.0871
5	No. of leaves/plant	0.1278	0.5043***	0.4056**	0.4586**	1.0000	-0.1652	0.3085	-0.0868
6	Length of leaf	0.2641	0.0267	-0.6167***	-0.5683**	-0.1652	1.0000	-0.4106**	0.2306
7	Diameter of leaf stalk	0.0491	0.1041	0.5091***	0.5551***	0.3085*	-0.4106**	1.0000	0.1618
8	Days for bud emergence	0.3139*	-0.3271*	-0.3062*	0.0871	0.0868	0.2306	0.1618	1.0000
9	Days for bud maturity	0.2481	0.2266	0.0436	0.2138	0.4530*	0.0018	0.2969	0.0642
10	Length of flower bud	0.0116	0.0840	0.3128*	0.3957*	-0.1159	0.0587	0.2735	0.2745
11	No. of flowers/plant	0.3627	0.1813	0.3944*	0.4855**	0.0968	-0.1583	0.0340	0.02000
12	Diameter of flower	0.2835	0.1824	0.2752	0.2863	-0.1172	-0.1488	-0.0176	-0.0911
13	No. of flowers/head	0.2827	0.0978	0.5779***	0.6566***	0.2073	-0.4770**	0.3253*	0.1779
14	No. of tubers/plant	-0.2625	0.0538	-0.3761*	-0.5241***	-0.1648	0.5185***	-0.4001**	0.0191
15	Diameter of tuber	0.1247	0.4181**	0.38417*	0.2274	0.0089	-0.2724	0.1078	-0.0744
16	Weight of tuber	0.3644*	0.2348	0.3670*	0.2713*	0.2369	-0.1699	0.2172	0.0524

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Sl. No.	Characters	Days for bud maturity	Length of Flower bud	No. of flowers/plant	Diameter of flower	No. of flowers/head	No. of tubers/plant	Diameter of tuber	Weight of tuber
		9	10	11	12	13	14	15	16
1	Days for Tuber sprouting	-0.2481	0.0116	0.3627	0.2835	0.2827	0.2625	0.1247	0.3644*
2	Plant height	0.2266	-0.0840	0.1818	0.1824	0.0978	0.0538	0.4181**	0.2348
3	No. of branches/plant	0.0436	0.3128*	0.3944*	0.2752	0.5779***	-0.3761*	0.3847*	0.3670*
4	Length of branch	0.2138	0.3957*	0.4855**	0.2863	0.6566***	-0.5241***	0.2274	0.2713
5	No. of leaves/plant	0.4530**	-0.1159	0.0968	-0.1172	0.2073	-0.1648	0.0089	0.2369
6	Length of leaf	0.0018	-0.0507	-0.1583	-0.1488	-0.4770**	0.5185***	-0.2724	-0.1699
7	Diameter of leaf stalk	0.2969	0.2735	0.0340	-0.0176	0.3253*	-0.4001**	0.1078	0.2172
8	Days for bud emergence	0.0642	0.2945	0.0200	-0.0911	0.1779	0.0191	-0.0744	0.0524
9	Days for bud maturity	1.0000	-0.1392	-0.0410	-0.0726	0.0792	-0.0971	-.2174	-0.0720
10	Length of Flower bud	-0.1392	1.0000	0.5625***	0.2637	0.2781	-0.0516	0.0914	0.3826*
11	No. of flowers/plant	-0.0410	0.5625***	1.0000	0.5661***	0.6273***	-0.0973	0.3117*	0.3807*
12	Diameter of flower	-0.0726	0.2037	0.5061***	1.0000	0.5847***	-0.1742	0.1314	0.1854
13	No. of flowers/head	0.0792	0.2781	0.6273***	0.5847***	1.0000	-0.3582*	0.2856	0.3078*
14	No. of tubers/plant	0.0971	-0.0973	-0.1742	-0.3582*	-0.0516	1.0000	0.1792	0.3414*
15	Diameter of tuber	-0.2174	0.0914	0.3117*	0.1314	0.2856	0.1792	1.0000	0.536***
16	Weight of tuber	-0.0720	0.3826*	0.3807*	0.1854	0.3078*	0.3414*	0.5636** *	1.0000

flowers/head (0.5420) and weight of tuber (0.4728) during 2012-13. The findings are inconsonance with Bihari *et al.* (4 & 5) and Katiyar *et al.* (6) .

Length of branch showed positive and highly significant genotypic correlation with number of leaves (0.4586), diameter of leaf stalk (0.5551), length of flower bud (0.3957), number of flowers/plant (0.4855), diameter of tuber (0.2274) and weight of tuber (0.2369)

during 2011-12. Length character also revealed positive and highly significant correlation with number of leaves/plant (0.3194), diameter of leaf stalk (0.6093), number of flowers/plant (0.4964), diameter of leaf stalk (0.6093), number of flowers/plant (0.4964), number of flowers/head (0.6115) and weight of tuber (0.4066) in the year 2012-13.

In genotypic correlation some negative relationships were also observed in different characters. However, the genotypic correlations are the different one as these were apparent in other correlations. Genotypic correlations have genetic meaning related with character's appearance in the performance.

Table 2: Genotypic correlation coefficient in Dahlia for 16 characters (2012-13).

Sl. No.	Characters	Days for tuber sprouting	Plant height	No. of branches / plant	Length of branch	No. of leaves/ plant	Length of leaf	Diameter of leaf stalk	Days for bud emergence
		1	2	3	4	5	6	7	8
1	Days for Tuber sprouting	1.0000	0.0118	0.0157	-0.2389	-0.1387	0.0368	0.3644	-0.3478
2	Plant height	0.0118	1.0000	0.1407	0.0699	0.2677	-0.0771	-0.1069	-0.3746*
3	No. of branches/ plant	0.0157	0.1407	1.0000	0.7399***	0.4934**	-0.5215* **	0.4602* *	-0.1372
4	Length of branch	0.2389	0.0969	0.7399	1.0000	0.3194*	-0.3607*	0.6093* **	0.0154
5	No. of leaves/plant	0.1387	0.2677	0.4934**	0.3194*	1.0000	-0.1680	0.2154	-0.1482
6	Length of leaf	0.0368	-0.0771	-0.5215* **	-0.3607*	0.1683	1.0000	-0.1704	0.3838*
7	Diameter of leaf stalk	-0.3044*	-0.1069	0.4602**	0.6093***	0.2157	-0.1704	1.0000	-0.0963
8	Days for bud emergence	-0.3478*	-0.3746*	-0.1372	0.0154**	0.0482	0.3838*	-0.0963	1.0000
9	Days for bud maturity	0.1375	-0.2267	-0.0868	0.1439	0.2145	0.2611	-0.2763	0.4832**
10	Length of Flower bud	0.0647	-0.0819	0.0750	0.0942	0.0102	-0.4900* *	0.2117	-0.508***
11	No. of flowers/plant	0.0057	0.3160*	0.3259*	0.4964**	0.0924	0.3295*	0.1660	-0.1944
12	Diameter of flower	-0.0004	0.4150* *	0.0510	0.1647	0.1620	-0.2632	0.1772	-0.3145*
13	No. of flowers/head	0.0283	0.1282	0.5420** *	0.6115**	0.1203	-0.3001*	0.3796*	0.126
14	No. of tubers/plant	-0.0415	0.1143	0.0691	-0.4529**	0.2760	0.1664	-0.2650	-0.0968
15	Diameter of tuber	-0.0079	0.4549* *	0.0406	0.1772	0.0517	0.0427	0.0020	-0.0233
16	Weight of tuber	0.0392*	-0.0617	0.4728**	0.4066**	0.3508*	-0.0788	0.2494	0.1543

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Sl. No.	Characters	Days for bud maturity	Length of flower bud	No. of flowers/plant	Diameter of flower	No. of flowers/head	No. of tubers/plant	Diameter of tuber	Weight of tuber
		9	10	11	12	13	14	15	16
1	Days for Tuber sprouting	0.1375	0.0647	0.0057	0.0004	0.0289	-0.0415	-0.0079	0.0392
2	Plant height	-0.2267	-0.0819	0.3160*	0.4150**	0.1282	0.1143	0.4549**	-0.0617
3	No. of branches/plant	-0.0868	0.0750	0.3259*	0.0510	0.5420** *	-0.0691	0.0406	0.4728**
4	Length of branch	-0.1439	0.0942	0.4964**	0.1647	0.6115** *	-0.4525**	0.1772	0.4066**
5	No. of leaves/plant	-0.2145	0.0102	0.0924	-0.1620	0.1203	0.0517	0.3560*	0.3508*
6	Length of leaf	0.2611	0.4900**	0.3295*	-0.2532	-0.3091*	0.1664	0.0427**	0.0788
7	Diameter of leaf stalk	-0.2763	0.2117	0.1660	0.1772	0.3796*	-0.2650	0.0020	0.2494
8	Days for bud emergence	0.4832**	-0.5081** *	-0.1944	-0.3145*	0.0126	-0.0968	-0.0233	0.1543
9	Days for bud maturity	1.0000	-0.0647	-0.2159	-0.1987	0.0328	0.0766	0.0441	0.2989
10	Length of Flower bud	0.0647	1.0000	0.3403*	0.5589** *	0.1604	0.3250*	-0.3660	0.0070
11	No. of flowers/plant	-0.2159	0.3403	1.0000	0.4898**	0.5921** *	-0.1231	0.3337*	0.2445
12	Diameter of flower	-0.1987	0.5589** *	0.4898**	1.0000	0.4940**	-0.0586	0.2389	-0.0625
13	No. of flowers/head	-0.0328	0.1604	0.5921** *	0.4940**	1.0000	0.2898	0.2518	0.1972
14	No. of tubers/plant	0.0766	-0.3250	0.1231	-0.0586	-0.2898	1.0000	0.0888	0.1560
15	Diameter of tuber	0.0441**	-0.3660	0.3337*	0.2389	0.2518	0.0888	1.0000	0.4215**

REFERENCES

- Anuradha, S. and Gowda, J.V.N. (1990). Genetic variability in gladiolus. *Prog. Hort.*, **22** (1-4) : 55-59.
- Anuradha, S. and Gowda, J.V.N. (1992). Phenotypic and genotypic correlation studies in gladiolus. *Crop Res.*, **5** (2) : 381-386.
- Beura, S. and Maharana, T. (1990). Genetic variance in different Dahlia varieties. *Orissa J. Agric. Res.*, **3** (2) : 169-172.
- Bihari, M., Kumar, R., Singh, K. and Prasad, A. (2009a). Phenotypic path-coefficient studies in floribunda rose genotypes. *J. Orn Hort.*, **12** (3) : 118-121.
- Bihari, M., Kumar, R. Singh, K. and Prasad, A. (2009b). Studies on genetic divergence in gladiolus genotypes. *J. Orn Hort.*, **12** (3) : 200-205.
- Katiyar, J.N., Prasad, A. and Arya, S. (1995). Studies on genotypic correlation in orchids. *Recent Hort.*, **4** (2) : 113-116.
- Prasad, A. and Pradhan, N. (1991). Studies on genotypic correlation in different characters in gladiolus. *Ibid.* PP: 42.



Citation : Singh H.M., Mishra U.S. and Prasad A. (2015). Study on genotypic correlation coefficient in dahlia germplasm. *HortFlora Res. Spectrum*, **4**(3) : 245-249