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Study on Genotypic Path Coefficient in Dahlia (Dahlia Variabilis)

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Abstract – **Dahlia (Dahlia variabilis) is an importance bulbous flower crop which has position to increase economic earning of grower. The Forty varieties were grown and studied for genotypic path correlation of traits at C.S. Azad University of Agriculture and Technology, Kanpur, during 2011-12 and 2012-13. The Vegetative and reproductive characters parameters were found to have considerable relationship which also indicated the scope for making improvement in Dahlia. The Plant height and maximum number of flower per head revealed the sustainable magnitude for crop improvement in Dahlia crop.**

Keywords – **Species, Varieties, Germplasm, Path, Dahlia.**

I. Introduction

It is a known fact that popularity of floricultural plants is increasing day by day to its growth and development performance. Standard quality of flowers production is a long felt need for making improvement leading to earn maximum price in markets. In our country flower plants cultivation is being considered a sophisticated lucrative business in the field of horticulture. In fact all the present day colorful flowering plants are the result of extensive hybridization and spontaneous research work carried out by the scientists engaged in this field (10), (3). Now-a-days floriculture is thought a profitable venture (7). India is exporting flowers and earning foreign exchange but it is not up to a great extent. The climatic conditions of this country are the best assets for producing desirable quality flowers which will fetch a handsome amount of profit in our markets and abroad. A considerable export potential has been emphasized in this field (11).

Seeing the future as a potential of export for flower production, floriculture as an industry has been considered by the authorities (2), (5). Several flower crops namely Rose, Gladiolus, Orchids, Carnation, Chrysanthemum etc. are grown and exported to different countries. Floriculture export industry is considered a diversified field for earning (3).

Due to this view there is an increasing demand for flowers in the national and international markets (11). With this fact the escape and area of floriculture industry has been increasing in the country day by day (6). In a large scale flowers are used for producing several being of products name performs, medicine oils etc perfects. Flowers also used to give the best colour and beauty effect in decoration and fragrance in atmosphere in certain occasions. In a broad sense among flowering plants bulbous plants are very much valued and have a special status in the word of flowers (4). Corporate and entrepreneurs are also engaged in the flower production and export industry (5), (9). In present era, commercial flower growing has become an integral part of Indian Agriculture (3), (8).

Dahlia has a large group of beautiful striking colours – bi-colours and multicolored cultivars (1). 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, pompan 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, States and North Eastern Hill regions in sporadic cultivation. In some Institutions, Universities and National/ Regional Centers/Research complex etc. grow it for different purposes.

II. Material And Methods

The studies were undertaken at instructional Farm, Department of Horticulture, College of Agriculture, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur U.P. during winter seasons of 2011-12 and 2012- 2013. The experiment was laid out in a Randomized Block Design with three replications. Forty varieties, Kenya Bi-colour, Gamki Sport, Croydon Gaint, Golden Glory, Duston Stone, Park Beauty, Eternity, Prime Minister, Alden Galaxy, Silver city, From by Supreme, Senior Ball, Snow Hill Rose, Doris Day, Sun Set, Robert Walker, Michael, Corton Lina, Sandhya, Powder Puff, Lord Budha, Mistral Delight, Kelvin, Rusting, Moon Place, Snow Top, Royal Rose, Sun Rise, Duccan Magic, Pompon, Alpana, Aditya, Black Out, Bara Kanchan, Kalvin Rose, Eternity Spot, Hara Gauri, Indira, Chicago, Krishna were taken for their evaluation under open field condition. Uniform-sized Dahlia bulbs (3.0-4.0 cm diameter) were planted was done in 1st week of November, on raised bed at a spacing 60cm x 60cm each entry comprised 12 plants and all the recommended agronomic uniform package of cultural practices were followed. The observation was recorded on five randomly selected plants per replication for each germplasm on sixteen important traits. Observations were recorded for days for sprouting of tubers, Plant height, Number of branches per plant, length of branch, Number of leaves per plant, length of leaf, diameter leaf stalk, Number of days for flower bud emergence, Number of days for flower bud maturity, length

of flower bud, number of flowers/plant, diameter of flower, Number flowers/head, Number of tuber, diameter of tuber, Weight of per tuber. The data collected were pooled and analyzed statistically.

III. Results and Discussion

In the flower production of this crop, data of genotypic path coefficient of table 1 and 2 showed interesting and encouraging results in present investigations. It was noted that number of tuber sprouting days gave negative and direct response with plant height (-0.0103), number of branches per plant (-0.09563), length of leaf (-0.0303), days for bud maturity (-0.0460) and length of tuber (-0.1415) during 2011-12. But important characters have showed the positive and direct genotypic effect tuber sprouting days revealed positive and direct effect on length of branch (0.8232), number of leaves per plant (0.1081), diameter of leaf stock (0.0111), days for bud emergence (0.3018), length of flower bud (0.0133), diameter of flower (0.0307) and number of flowers per head (0.2265) during 2011-12. Similarly other aspects of this crop also revealed the positive and direct effect in path coefficient.

In the observations of data for the trial of second year, genotypic path coefficient revealed favorable results in defect traits. Period of tuber sprouting gave positive and effect on diameter of stock (0.1054), days for bud emergence (0.2110), days bud maturity (0.0125), number of flowers per plant (0.0025), length tuber (0.0167) and diameter of tuber (0.0032) during 2012-2013. The other different aspects have also negative and positive response to numbers of flowers.

Table 1. Genotypic Path coefficient analysis of number of flower Vs other characters (2011-12).

Sr. No.	Characters	Sprouting of tuber	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	Sprouting of Tuber	0.8165	-0.0103	-0.9563	0.8232	0.1081	-0.0303	0.0111	0.3018
2	Plant height	0.0115	0.7346	-0.3462	0.1547	0.4264	0.0031	0.0235	0.3145
3	No. of branches/ plant	0.3916	-0.1295	-0.9636	0.6598	0.3430	0.0708	0.1150	0.2944
4	Length of branch	0.2396	-0.1380	-0.5738	0.8232	0.3878	-0.0653	0.1254	-0.0838
5	No. of leaves/plant	0.1043	0.3705	-0.7964	0.3775	0.8456	-0.0190	0.0697	0.0835
6	Length of leaf	0.2157	0.0196	0.2109	-0.4678	-0.1397	0.1149	-0.0927	-0.2217
7	Diameter of leaf stalk	0.0401	0.0765	-0.9997	0.4569	0.2609	-0.0472	0.2258	-0.1556
8	Days for bud emergence	-0.2563	0.2403	0.6012	0.0717	-0.0734	0.0265	0.0365	-0.9614
9	Days for bud maturity	-0.2026	-0.1665	-0.0856	0.1760	0.3830	0.0002	0.0671	0.0618
10	Length of Flower bud	0.0094	0.0617	-0.6142	0.3258	-0.0980	-0.0058	0.0618	-0.2639
11	Diameter of flower	0.2315	-0.1340	-0.5403	0.2356	-0.0991	-0.0171	-0.0040	0.0876
12	No. of flowers/head	0.2308	-0.0719	0.1347	0.5405	0.1753	-0.0548	0.0735	-0.1711
13	Length of tuber	0.2143	0.0395	0.7385	-0.4314	-0.1393	0.0596	-0.0904	-0.0183
14	Diameter of tuber	0.1018	-0.3072	-0.7555	0.1872	0.0076	-0.0313	0.0243	0.0715
15	Weight of tuber	0.2975	-0.1725	-0.7206	0.2234	0.2003	0.0195	0.0491	-0.0504

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S. No.	Characters	Days for bud maturity	Length of Flower bud	Dia. of Flower	No. of Flowers/ Head	Length of Tuber	Diameter of Tuber	Weight of tuber	Genotypic correlation with no. of flowers/ plant
		9	10	11	12	13	14	15	16
1	Sprouting of Tuber	-0.0466	0.0133	0.0307	0.2265	-0.1415	0.1425	-0.3446	0.3627
2	Plant height	0.0420	0.0962	0.0197	0.0784	0.0290	0.4776	0.0220	0.1813
3	No. of branches/ plant	0.0081	0.0298	0.4629	-0.2027	0.4395	0.3553	-0.3471	0.3944
4	Length of branch	0.0397	0.4533	0.0310	0.5260	-0.2823	0.2597	-0.2566	0.4857
5	No. of leaves/plant	0.0840	0.1327	-0.0127	0.1661	0.0888	0.0102	0.2240	0.0968
6	Length of leaf	0.0003	-0.0581	-0.0161	-0.3821	0.2795	-0.3111	0.1607	-0.1583
7	Diameter of leaf stalk	0.0551	0.3133	-0.0019	0.2606	-0.2157	0.1231	-0.2054	0.0340
8	Days for bud emergence	0.2408	0.6013	0.0717	0.0734	0.0265	0.8865	0.0496	0.0200
9	Days for bud maturity	0.1855	-0.1594	0.0079	0.0634	-0.0503	0.2483	0.0681	-0.0410
10	Length of Flower bud	-0.0258	0.1459	0.0285	0.2228	-0.0278	0.1044	-0.3618	0.5625
11	Diameter of flower	-0.0135	0.3021	0.1081	0.4684	-0.0939	0.1501	-0.1754	0.5061
12	No. of flowers/head	0.0147	0.3185	0.0632	0.8011	0.1931	0.3263	0.2911	0.6273
13	Length of tuber	0.0180	-0.0592	-0.0188	-0.2869	0.5390	0.2047	0.3229	-0.0973
14	Diameter of tuber	0.0403	0.0715	0.5330	0.1047	0.0142	0.2288	0.0966	0.3117
15	Weight of tuber	0.0134	0.4382	0.0201	0.2466	0.1840	0.6438	0.9458	0.3807

Table 2. Genotypic Path coefficient analysis of number of flower Vs other Characters (2012-13).

Sr. No.	Characters	Sprouting of tuber	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	Sprouting of Tuber	-0.1898	-0.0020	-0.0056	-0.0815	-0.0299	-0.0077	0.1054	0.2110
2	Plant height	-0.0022	-0.0016	-0.0502	0.0331	0.0577	0.0162	0.0370	0.2272
3	No. of branches/ plant	-0.0030	-0.0238	-0.3565	0.2525	0.1064	0.1094	-0.1594	0.0832
4	Length of branch	-0.0453	-0.0164	-0.2638	0.3413	0.0689	0.0757	-0.2111	-0.0093
5	No. of leaves/plant	0.0263	-0.0453	-0.1759	0.1090	0.2157	0.0353	-0.0746	0.0899
6	Length of leaf	-0.0070	0.0130	0.1859	-0.1231	-0.0362	-0.2099	0.0590	-0.2328
7	Diameter of leaf stalk	0.0578	0.181	-0.1641	0.2080	0.0465	0.0358	-0.3465	0.0584
8	Days for bud emergence	-0.0666	0.0440	0.0489	0.0053	-0.0320	-0.0805	0.0333	-0.2261
9	Days for bud maturity	-0.6066	0.0634	0.4075	-0.2843	0.0011	0.0390	0.0094	-0.2931
10	Length of Flower bud	0.0123	0.0139	-0.0267	0.0321	0.0022	0.1028	-0.0734	0.3082
11	Diameter of flower	0.0001	-0.0703	-0.0182	0.0562	-0.0349	0.0552	-0.0614	0.1908
12	No. of flowers/head	0.0054	-0.0217	-0.1933	0.2087	0.0260	0.0630	-0.1315	0.0077
13	Length of tuber	0.0079	-0.0194	0.0246	-0.1546	0.0595	-0.0349	0.0918	0.0587
14	Diameter of tuber	0.0015	-0.0770	-0.0145	0.0605	0.0111	-0.0090	-0.0007	0.0142
15	Weight of tuber	-0.0074	0.0105	-0.1686	0.1388	0.0756	0.0165	-0.0864	-0.0936

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S. No.	Characters	Days for bud maturity	Length of Flower bud	Dia. of Flower	No. of Flowers/ Head	Length of Tuber	Diameter of Tuber	Weight of tuber	Genotypic correlation with no. of flowers/ plant
		9	10	11	12	13	14	15	16
1	Sprouting of Tuber	0.0125	-0.0519	-0.0003	0.0025	0.0167	0.0032	0.0232	0.0057
2	Plant height	-0.0206	0.0656	0.3751	0.0114	0.0460	-0.1827	-0.0365	0.3160
3	No. of branches/ plant	0.0079	-0.0601	0.0461	0.0483	0.0278	-0.0163	0.2793	0.3253
4	Length of branch	-0.0131	0.0755	0.1488	0.0544	0.1822	-0.0712	0.2402	0.4964
5	No. of leaves/plant	0.0195	-0.0082	-0.1464	0.0107	-0.1110	-0.0207	0.2072	0.0924
6	Length of leaf	0.3929	-0.2379	-0.0267	-0.0669	-0.0171	-0.0465	0.0232	-0.3295
7	Diameter of leaf stalk	0.0251	-0.1698	0.1602	0.0338	0.1066	-0.0008	0.1473	0.1660
8	Days for bud emergence	0.0384	0.0310	-0.0491	-0.0463	-0.0548	0.0957	0.0911	-0.1944
9	Days for bud maturity	0.0910	0.0519	-0.1796	-0.0029	-0.0308	-0.0177	0.1765	-0.2159
10	Length of Flower bud	-0.0059	-0.8019	0.5052	0.0143	0.1307	0.1470	0.0041	0.3403
11	Diameter of flower	-0.0181	-0.4482	0.9039	0.0440	0.0236	-0.0959	-0.0369	0.4898
12	No. of flowers/head	0.0030	-0.1287	0.4465	0.0890	0.1166	-0.1011	0.2346	0.5921
13	Length of tuber	0.0070	0.2607	0.0530	-0.0258	-0.4022	-0.0356	0.0922	-0.1231
14	Diameter of tuber	0.0040	0.2935	0.2159	0.0224	-0.0357	-0.4016	0.2490	0.3337
15	Weight of tuber	0.0272	-0.0056	0.0565	0.0354	-0.0628	-0.1693	0.5907	0.2445

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