



## RESEARCH PAPER

# Study on environmental path co-efficient in dahlia

H. M. Singh\* and U. S. Mishra<sup>1</sup>

National Horticultural Research and Development Foundation, INDORE (M.P.) INDIA

(Email : [hmsingh1983@gmail.com](mailto:hmsingh1983@gmail.com))

**Abstract :** Dahlia is an importance bulbous flower crop which has position to increase economic earning of grower. Forty varieties were grown and studied for environmental path correlation of traits at C.S. Azad University of Agriculture and Technology, Kanpur, during 2011-12 and 2012-13. Vegetative and reproductive character parameters 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.

**Key Words :** Species, Varieties, Germplasm, Dahlia, Path

**View Point Article :** Singh, H.M. and Mishra, U. S. (2018). Study on environmental path co-efficient in dahlia. *Internat. J. agric. Sci.*, 14 (1) : 192-195, DOI:10.15740/HAS/IJAS/14.1/192-195.

**Article History :** Received : 28.10.2017; Revised : 30.11.2017; Accepted : 13.12.2017

## 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 (Swarup and Singh, 1984 and Chadha, 1993).

Now-a-days floriculture is thought a profitable venture (Kumar *et al.*, 2013). India is exporting flowers and earning foreign exchange but it is not upto 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 (Teaotia, 1996).

Seeing the future as a potential of export for flower production, floriculture as an industry has been considered by the authorities (Chadha and Chaudhary, 1992 and Dadlani, 1996a).

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 (Chadha, 1993).

Due to this view there is an increasing demand for flowers in the national and international markets (Teaotia, 1996). With this fact, the scope and area of floriculture industry has been increasing in the country day by day

\* Author for correspondence:

<sup>1</sup>Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, SATNA (M.P.) INDIA

(Dadlani, 1996b). 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 (Chadha, 1993b).

Corporate and entrepreneurs are also engaged in the flower production and export industry (Dadlani, 1996; Swarup and Bhargava, 1986). In present era, commercial flower growing has become an integral part of Indian Agriculture (Chadha, 1993 and Prasad, 1998).

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

**Table 1: Environmental path co-efficient 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	0.1132	-0.0016	0.0185	0.0015	-0.0356	-0.0018	-0.0028	0.0077
2.	Plant height	0.0019	-0.0935	0.0163	-0.0010	0.0473	-0.0036	-0.0321	-0.0408
3.	No. of branches/ plant	0.0147	-0.0107	0.1426	0.0010	-0.0032	-0.0043	-0.0282	0.0195
4.	Length of branch	0.0132	0.0072	-0.0110	-0.0131	0.0403	0.0112	0.0026	-0.0299
5.	No. of leaves/plant	-0.0230	-0.0253	-0.0026	0.0030	0.1748	0.0080	0.0014	-0.0651
6.	Length of leaf	0.0069	-0.0113	0.0204	0.0049	0.0468	-0.0300	-0.0100	0.495
7.	Diameter of leaf stalk	-0.0019	0.0178	-0.0238	-0.0002	0.0015	0.0019	0.1688	-0.0056
8.	Days for bud emergence	0.0033	0.0146	0.0107	0.0015	-0.0436	-0.0057	-0.0036	0.2608
9.	Days for bud maturity	0.0161	0.0061	-0.0126	0.0014	-0.0228	0.0009	0.0140	0.0220
10.	Length of flower bud	0.0123	0.0069	-0.0154	-0.0008	-0.0023	0.0067	0.0306	-0.0555
11.	Diameter of flower	0.0060	0.0102	-0.0123	-0.0021	0.0515	0.0041	-0.0011	-0.0505
12.	No. of flowers/head	0.0097	0.0144	0.0156	0.0009	0.0100	0.0045	-0.0321	-0.0104
13.	Length of tuber	-0.0215	0.0008	-0.0355	-0.0040	-0.0045	0.0004	-0.0181	-0.0512
14.	Diameter of tuber	0.0175	0.0174	0.0255	-0.0006	0.0447	0.0040	-0.0036	-0.0073
15.	Weight of tuber	-0.0070	-0.0031	0.0025	-0.0018	0.0332	0.0018	-0.0006	-0.0259
		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	0.0218	-0.0033	-0.0010	0.0058	-0.0132	0.0249	0.0054	0.0897
2.	Plant height	0.1000	-0.0022	-0.0021	0.0105	-0.0006	0.0294	-0.0029	-0.0834
3.	No. of branches/ plant	-0.0135	0.0033	0.0016	-0.0074	-0.0173	0.0282	-0.0016	0.0682
4.	Length of branch	-0.0166	-0.0018	-0.0030	0.0046	0.0213	-0.0071	-0.0119	0.0348
5.	No. of leaves/plant	-0.0201	0.0004	-0.0056	0.0039	-0.0018	-0.0405	-0.0168	-0.0153
6.	Length of leaf	-0.0046	0.0067	0.0026	0.0102	-0.0008	0.0209	0.0051	0.0228
7.	Diameter of leaf stalk	0.0128	0.0055	0.0001	0.0129	0.1074	0.0034	0.0003	0.1751
8.	Days for bud emergence	0.0129	0.0064	0.0037	0.0027	-0.0136	0.0044	0.0087	0.2633
9.	Days for bud maturity	0.1536	0.0054	0.0010	0.0120	0.0070	0.0190	-0.0039	0.2190
10.	Length of flower bud	-0.0127	-0.0302	-0.0031	-0.0022	-0.0042	0.0078	-0.0112	-0.1175
11.	Diameter of flower	-0.0080	-0.0049	-0.0191	-0.0009	0.0017	0.0110	0.0007	-0.0560
12.	No. of flowers/head	-0.0271	0.0010	-0.0003	-0.0679	0.0046	-0.0118	0.0098	-0.1202
13.	Length of tuber	0.0155	0.0018	-0.0005	-0.0045	0.0696	0.0258	0.1080	-0.0439
14.	Diameter of tuber	-0.0184	-0.0015	-0.0013	-0.0051	-0.0114	0.1583	-0.0041	-0.1022
15.	Weight of tuber	0.0069	-0.0039	0.0002	0.0076	0.0142	-0.0074	0.0882	0.0714

has a large group of beautiful striking colours – bi-colours and multicolored cultivars (Basu and Bose, 1970). 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/

**Table 2: Environmental Path co-efficient 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	-0.0386	0.0012	-0.0002	-0.0335	0.0074	-0.0041	-0.0019	0.0023
2.	Plant height	0.0003	0.7115	0.0006	-0.0394	0.0019	0.1352	-0.0008	0.0018
3.	No. of branches/ plant	0.0070	-0.0059	0.0012	0.0064	-0.0000	0.0045	0.0007	0.0041
4.	Length of branch	0.0081	-0.0422	0.0000	0.1603	-0.0051	0.0086	0.0019	0.0030
5.	No. of leaves/plant	0.0060	-0.0068	0.0000	0.0172	-0.0473	0.0032	-0.0009	0.0149
6.	Length of leaf	0.0058	-0.0053	0.0002	0.0501	-0.0056	0.0274	0.0000	-0.0005
7.	Diameter of leaf stalk	0.0036	0.0148	0.0000	0.0147	0.0021	0.0000	0.0209	0.0114
8.	Days for bud emergence	0.0014	-0.0271	0.0001	-0.0077	0.0112	0.0002	-0.0038	-0.0631
9.	Days for bud maturity	0.0060	0.0231	-0.0000	-0.0114	0.0007	-0.0026	-0.0028	0.0044
10.	Length of flower bud	-0.0012	0.0134	-0.0002	0.0007	0.0006	-0.0002	0.0036	0.0140
11.	Diameter of flower	-0.0039	-0.0197	0.0000	-0.0130	-0.0039	-0.0065	0.0022	0.0095
12.	No. of flowers/head	-0.0024	0.0172	-0.0003	-0.0170	0.0037	-0.0059	-0.0030	0.0003
13.	Length of tuber	0.0018	0.0171	-0.0002	0.0015	0.0159	-0.0047	0.0025	-0.0010
14.	Diameter of tuber	-0.0051	0.0535	-0.0001	-0.0029	0.0059	-0.0017	-0.0013	0.0011
15.	Weight of tuber	0.0015	0.0076	0.0001	-0.0197	0.0051	-0.0022	0.0009	-0.0094
		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	0.225	-0.0010	-0.0016	-0.0149	0.0043	-0.0017	-0.0082	-0.0677
2.	Plant height	0.0100	0.0194	-0.0023	0.0018	-0.0240	-0.0093	-0.0039	0.0092
3.	No. of branches/ plant	0.0036	0.0043	-0.0004	0.0509	0.0154	0.0009	0.0120	0.0145
4.	Length of branch	0.0102	-0.0001	0.0013	0.0255	0.0009	0.0002	0.0255	0.1454
5.	No. of leaves/plant	0.0022	0.0004	-0.0013	0.0186	0.0320	0.0016	0.0223	0.0620
6.	Length of leaf	0.0135	0.0002	0.0038	0.0518	0.0163	0.0008	-0.0167	0.1419
7.	Diameter of leaf stalk	0.0194	-0.0052	0.0017	0.0344	-0.0115	0.0008	0.0087	0.1158
8.	Days for bud emergence	0.0153	0.0066	-0.0024	0.0010	-0.0016	0.0002	0.0309	-0.0695
9.	Days for bud maturity	-0.1575	0.0045	-0.0029	0.0291	-0.0093	-0.0002	-0.0231	-0.1439
10.	Length of flower bud	0.0218	-0.0299	0.0001	-0.0289	0.0017	0.0010	-0.0168	-0.0203
11.	Diameter of flower	-0.0264	0.0002	-0.0160	-0.0174	-0.0015	-0.0002	0.0139	-0.1062
12.	No. of flowers/head	0.0178	-0.0036	-0.0012	-0.2399	0.0129	0.0015	0.0106	-0.2093
13.	Length of tuber	-0.0140	0.0005	-0.0002	0.0324	-0.0953	-0.0026	0.0069	-0.0395
14.	Diameter of tuber	-0.0019	0.0024	-0.0003	0.0277	-0.0199	-0.0126	0.0093	0.0541
15.	Weight of tuber	-0.0031	0.0024	-0.0011	-0.0123	-0.0032	-0.0006	0.2075	0.1634

Regional Centers/Research complex etc. grow it for different purposes.

## MATERIAL 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 experiment material consisted of 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 were statistically analyzed. The genetic diversity among the genotypes was worked out using Mahalanobis  $D^2$  statistics as described by (Rao, 1952). 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

Data of the environmental path co-efficient have been noted and summarized in Tables 1 and 2.

It is apparent from the summarized data in Tables 1 and 2 that in environmental path number of days for tuber sprouting gave positive and direct effect with maximum number of flowers and number of branches per plant (0.0185), length of branch (0.0015), days required bud emergence (0.0077), days for bud maturity (0.0218), number of flowers per plant (0.0058), diameter of tuber (0.0249) and weight of tuber (0.0054) in the investigations of 2011-12. Other important aspects have also shown the positive and direct effect on this trait. However, some characters have revealed the negative and direct effect on number of flower production.

In the analysis of data of path co-efficient of second year showed favourable results in this trait. The plant height (0.0012), number of leavers per plant (0.0074), days for bud emergence (0.0023), days for bud maturity (0.0225) and length of tuber (0.0043), revealed positive and direct effect on number of flower production per plant. Other traits have also showed the similar effects

in relation to flower production in present investigations during 2012-13 (Table 2).

Through the analysis of variance of the experiment highly significant differences were observed among 40 varieties in respect of all the sixteen characters. The differences among the varieties were also found significant when aggregate effect of all the characters was tested by wilk's criterion. All parameters connecting genetic divergence are also described.

## REFERENCES

- Basu, A. and Bose, T.K. (1970).** The ornamental plants. *Indian Hort.*, **277** : 21-22.
- Bertheir, S. (1987).** Studies on defoliation in Dahlia. *Plant Sci.* **18** : 21-23.
- Chadha, K.L. and Chaudhary, B. (1992).** Ornamental Horticulture in India. I.C.A.R., New Delhi, India. pp.1-40.
- Chadha, K.L. (1993a).** Floriculture research. *Indian J. Orna. Hort.*, **1** (1) : 1-12.
- Chadha, K.L. (1993b).** *Looking back*. Golden Jubilee Symp. Hort. Changing. Scenario Souvenir. pp. (I-IV).
- Dadlani, N.K. (1996a).** Basic scenario of Indian floriculture. *Floriculture Today*, **1** (1) : 41-42.
- Dadlani, N.K. (1996b).** Floriculture Industry in India. *Floriculture Today*, **1** (6) : 9-12.
- Kumar, A., Prasad, A. and Arya, S. (2013).** Environmental path co-efficient studies in gladiolus genotypes. *Plant Sci.* **45-46** : 9-13.
- Prasad, A. (1998).** Export potentiality of floricultural products. *Sci. J. Hort.*, **1** : 38-40.
- Rao, C.R. (1952).** *Advanced statistical methods in biometric research*. John Wiley, NEW YORK, U.S.A.
- Swarup, V. and Singh, B. (1984).** Ornamental horticulture in India. *Indian Hort.*, **29** : (2) : 5-8.
- Swarup, V. and Bhargava, S.C. (1986).** Export of ornamentals. *Indian Hort.* **12** (4) : 25-30.
- Teaotia, S.S. (1996).** *Potential of horticulture export in India*. Souvenir. State U.P. Flower Mag., 82-87pp.

14<sup>th</sup>  
Year  
★★★★★ of Excellence ★★★★★