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Evaluation of different dahlia (*Dahlia variabilis* L.) genotypes for growth and development

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Abstract
The experiment on "Evaluation of different dahlia (*Dahlia variabilis* L.) genotypes for growth and development" was carried out at the Department of Floriculture and Landscape Architecture, College of Horticulture, Sirsi, University of Horticultural Sciences, Bagalkot, Karnataka with a view to find out the best genotypes for growth and development. Among 35 genotypes, genotype HUBD-26 recorded highest plant height (116.69 cm), number of primary branches (9.5) and secondary branches (13.90), number of leaves (282.50), leaf area (9805 cm^2), plant spread East to West and North to South (43.45 cm, 44.40 cm respectively) and duration of crop (151.50 days).

Keywords: HUBD-horticulture university of Bagalkot dahlia

Introduction
Dahlia (*Dahlia variabilis* L.) is a bushy, tuberous, herbaceous ornamental plant native to Mexico. It is a member of the asteraceae family, dicotyledonous plant; related species includes sunflower, daisy, chrysanthemum and zinnia. There are approximately 42 species in the genera of dahlia, with hybrids commonly grown as garden plants. It is one of the most popular tuberous rooted perennial and herbaceous flowering plant valued for their gorgeous attractive spectacular flowers with the multitude of colors, greater variation in size ranging from miniature to giant types (Hegde *et al*., 2022) [7]. The stems are succulent, ranging in height from 30 cm to 180 cm. The majority of species or cultivars do not produce scented flowers. Whereas, most of the plants do not attract pollinating insects through scent and they exhibit most hues with different colours.

Dahlia is best suited for gardening because they are easy to grow both in field and pot. Flowers having attractive colourful daisy like flowers bloom which normally increase the beauty of gardens. Hence they are extensively used for exhibition, garden display and home decoration. For exhibition and garden display all types of dahlias are used. Dwarf growing types are suitable for beds and borders (pure or mixed borders). Large flowering dahlias in pots are popular for terrace garden or varandah display. The long stemmed flowers of various forms and colours are used in flower arrangement. Cut flowers of pompon and miniature types stay fresh in flower vases for many days and also good for making garlands (Manjula *et al*., 2017) [8]. As the number of dahlia cultivars are continuously increasing, the newly constituted cultivars need to be more intensively monitored for novelty, distinctness, uniformity and stability. Keeping these points in view, the present investigation was undertaken with objective to evaluate the different dahlia (*Dahlia variabilis* L.) genotypes for growth and development.

Material and Methods
The experiment entitled with "Evaluation of different dahlia (*Dahlia variabilis* L.) genotypes for growth and development" was carried out at the Department of Floriculture and Landscape Architecture, College of Horticulture, Sirsi, University of Horticultural Sciences, Bagalkot, Karnataka with 35 genotypes of dahlia *viz*. HUBD-1 to HUBD-35 were planted according to randomized block design with two replications. All recommended package of practices were carried out to grow the successful crop. Observations were recorded on all the indicating parameters *viz*. plant height (cm), number of primary branches, number of secondary branches, number of leaves, leaf area (cm^2), plant spread East to West (E-W cm) and North to South (N-S cm) and crop duration (days).

Results and Discussion

All the parameters were significantly varied under the study (Table 1). Genotype HUBD-26 recorded highest plant height (116.69 cm) which was on par with genotype HUBD-17 (111 cm) and genotype HUBD-29 recorded the least plant height (66.44 cm). Whereas, plant height being a genetically controlled factor, it varied among the genotypes as well as influence of the growing environmental conditions, production technology and cultural practices. Similar variation in plant height due to cultivars was also observed in dahlia by Syamal and Kumar (2002) [16] and Shukla *et al.* (2018), Narsude *et al.* (2010) [10] in marigold. Whereas, Genotype HUBD-26 had highest number of primary branches (9.5) followed by HUBD-17 (8.95) and genotype HUBD-10. Whereas, Genotype HUBD-26 had highest number of primary branches (9.5) followed by HUBD-17 (8.95) and genotype HUBD-10 had least number of primary branches (5.60). The number of secondary branches was recorded highest in genotype HUBD-26 (13.90) which is followed by genotype HUBD-17 (12.85) and genotype HUBD-25 had least number of branches (6.90). The difference in number of primary and secondary branches could be attributed to the genetic makeup of the cultivars. Increased number of branches leads to production of more number of leaves in turn it will enhance the yield of flowers and tubers by increasing source and sink relationship. Similar trend was noticed by Gupta *et al.* (2015) [6] in dahlia and Munikrishnappa (2011) [9] and Chowdhuri *et al.* (2015) [3] in different China aster genotypes.

Leaves are the functional units for photosynthesis, which greatly influence the growth and flower yield of any crop. Genotype HUBD-26 (282.50) recorded highest number of leaves which was found at par with genotype HUBD-17 (275.50), HUBD-23 (269.50) and HUBD-27 (262.50). Whereas, genotype HUBD-29 recorded the least number of leaves (100.32). The production of increased number of leaves in these cultivars may be due to increased plant height and number of branches. Similar results were reported in dahlia by Dhane and Nimbalkar (2002) [4] and Ajeetkumar *et al.* (2015) [1]. While Singh *et al.* (2017) [14] in gladiolus. Leaf area was highest in genotype HUBD-26 (9805 cm^2). While genotype HUBD-17 (9798 cm^2) was found on par with HUBD-26. The minimum leaf area was registered in HUBD-29 (4498.08 cm^2). Similar variation was observed by Raghupathi *et al.* (2019) [11] in dahlia, Shruti *et al.* (2004) [12] in gerbera and Umesh *et al.* (2018) [17] in marigold.

Plant spread is an important growth factor for flower crops. It helps to utilize the sunlight to maximum extent. Maximum plant spread in both the direction East to West and North to South was recorded in genotypes HUBD-26 (43.45 cm, 44.40 cm respectively). This may due to more number of branches produced by these genotypes and vigorous growth character. Whereas, the genotype HUBD-31 (33.90 cm) produced minimum plant spread for east to west and HUBD-19 (33.70 cm) for north to south. This may be due to varietal differences and less vigorous in growth. Similar results were recorded by Shukla *et al.* (2018) [13] in dahlia, Singh *et al.* (2014) [15] in gerbera. Whereas Dimri *et al.* (2017) [5] in tuberose. The duration of crop varied significantly among the genotypes. The genotype HUBD-26 had longest duration of crop (151.50 days) which is at par with HUBD-17 (148.00 days) and HUBD-23 (144.75 days) while, the genotype HUBD-8 had least duration of crop (122.50 days). It may be due difference in genetic makeup. Similar results were obtained by Vikas *et al.* (2011) [18] in dahlia and Asma *et al.* (2018) [2] in chrysanthemum.

Table 1: Evaluation of different dahlia (*Dahlia variabilis* L.) genotypes for growth and development

Genotypes	Plant height (cm)	Number of primary branches	Number of secondary branches	Number of leaves	Leaf area (cm^2)	Plant spread		Crop duration (Days)
						E-W (cm)	N-S (cm)	
HUBD-1	72.50	6.40	8.35	128.44	6715.43	37.68	37.97	130.55
HUBD-2	76.09	7.70	9.30	151.10	6882.24	37.00	35.90	129.60
HUBD-3	84.50	7.70	9.80	147.82	7540.49	38.35	37.65	132.20
HUBD-4	95.50	5.80	9.75	151.70	6974.40	36.55	39.20	131.70
HUBD-5	99.00	7.00	9.60	130.56	6615.58	38.50	35.55	128.65
HUBD-6	100.81	7.85	10.50	256.00	7938.00	39.35	40.40	136.20
HUBD-7	87.50	6.35	8.80	153.00	7810.00	36.35	37.35	124.70
HUBD-8	80.07	7.70	10.10	145.00	6380.78	34.25	38.33	122.50
HUBD-9	100.00	7.50	8.70	138.66	6729.12	37.40	38.77	131.10
HUBD-10	77.92	5.60	9.10	149.46	5464.66	36.00	36.40	130.45
HUBD-11	71.00	6.90	9.15	130.94	5996.06	37.21	34.65	131.40
HUBD-12	96.78	5.90	7.90	132.34	6440.64	35.85	38.65	124.95
HUBD-13	83.28	6.30	9.95	184.38	7761.44	36.15	36.00	127.85
HUBD-14	70.00	7.90	8.54	195.68	7498.24	35.95	36.45	132.51
HUBD-15	85.50	7.40	8.05	147.88	7895.00	38.08	35.50	129.45
HUBD-16	85.05	6.90	10.10	122.70	6257.37	34.75	37.95	123.90
HUBD-17	111.00	8.95	12.85	275.50	9798.00	42.35	43.24	148.00
HUBD-18	73.00	6.95	10.33	136.64	6119.33	36.00	37.70	123.30
HUBD-19	80.00	7.20	10.25	124.24	7727.57	38.15	33.70	133.85
HUBD-20	89.45	7.70	9.90	146.46	8595.82	38.00	38.20	133.30
HUBD-21	95.86	7.10	8.05	168.02	8970.62	34.40	36.85	130.25
HUBD-22	79.61	7.30	7.25	101.52	4577.82	35.70	35.95	132.90
HUBD-23	106.50	8.30	12.10	269.50	8767.93	40.25	42.41	144.75
HUBD-24	87.50	7.60	8.45	132.10	6799.42	35.25	39.25	134.40
HUBD-25	78.44	7.60	6.90	153.00	7530.00	34.15	36.55	126.15
HUBD-26	116.69	9.50	13.90	282.50	9805.00	43.45	44.40	151.50
HUBD-27	102.00	8.00	11.70	262.50	8450.00	40.90	41.40	139.20

HUBD-28	81.00	6.90	8.10	116.66	5221.70	37.30	37.90	131.30
HUBD-29	66.44	6.65	8.15	100.32	4498.08	33.95	37.35	124.40
HUBD-30	93.16	7.00	8.44	215.46	6506.00	35.75	37.65	126.45
HUBD-31	88.00	7.20	9.99	149.88	7069.65	33.90	36.50	129.00
HUBD-32	94.06	7.05	10.27	145.76	6825.96	35.25	38.30	133.45
HUBD-33	86.31	7.95	8.05	143.50	5499.40	38.40	35.00	132.45
HUBD-34	78.03	6.70	8.50	121.00	5941.95	36.45	34.30	124.10
HUBD-35	78.68	7.00	8.65	115.10	5848.96	36.50	35.75	125.35
Mean	87.18	7.24	9.41	160.72	7012.93	37.01	37.39	131.19
S.Em±	3.20	0.26	0.27	7.35	306.48	1.31	1.29	3.09
CD at 5%	9.21	0.75	0.76	21.12	880.08	3.76	3.69	8.8
CV	5.20	5.06	4.00	6.47	6.18	5	4.82	3.33

Conclusion

On the basis of present investigation it is concluded that, out of thirty five genotypes HUBD-26 recorded highest plant height, number of primary branches and secondary branches, number of leaves, leaf area, Plant spread in both the direction and duration of crop.

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