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Evaluation of Chrysanthemum on Growth and Flowering Yield of Newly Evolved Genotypes of Chrysanthemum (*Dendranthema grandiflora* Tzvelev) for Loose Flower Production

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A B S T R A C T

An experiment was conducted on Evaluation of chrysanthemum on growth and flowering yield of newly evolved genotypes of chrysanthemum (*Dendranthema grandiflora* Tzvelev) for loose flower production at the experimental farm of Department of Floriculture and Landscape Architecture, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan and ICAR-IARI Regional Research Station, Katrain, Kullu Valley of H.P. for two successive years 2017 and 2018 on nineteen genotypes of chrysanthemum, including cultivar 'Surf' as check for loose flower production. On the bases of flower weight it was concluded that genotype namely 'UHFSChr 117', 'UHFSChr111','UHFSChr132' including cultivar 'Surf' were recommended for loose flower production.

Introduction

Chrysanthemum (*Dendranthema grandiflora* Tzvelev) belongs to family Asteraceae (Andreson, 1987). It is commonly known as guldaudi/autumn queen/queen of East. It is native to northern hemisphere chiefly Europe and Asia. Species in the genus chrysanthemum varies from 100 to 200. It ranks second after rose in spray and seventh in standard type of flower production and also ranked second in loose flower production after marigold (Anonymous, 2017). In India, Karnatka is the most prominent chrysanthemum growing state with an area of 5,453 ha with production of 59,543 MT and productivity of 10.92 t/ha. In India during 2016-2017 the area under chrysanthemum was 20090 hectare and production of loose flower was 185240 MT (Anonymous, 2018).Chrysanthemum have wide range of flower colour, growth habit, size and shape. It

is used for making garlands, venis, gajras and religious offering.

There are large numbers of germplasm available but could not fulfill the requirements in terms of new colors, forms, types and various characteristics. However; there is always a demand of superior and new flowers over the existing cultivars. Therefore, there is urgent need to identify stable genotypes having wider adaptability and easy availability to the growers at cheaper rate. Therefore, an investigation was conducted for evaluation of chrysanthemum on growth and flowering yield for general cultivation over wide range of environment to increase the income of farmer.

Materials and Methods

A trial was conducted to evaluate newly evolved genotypes of chrysanthemum for loose flower production at experimental farm of Department of Floriculture and Landscape Architecture, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan and ICAR-IARI, Regional Research Station, Katrain, Kullu Valley of H.P. for two successive years 2017 and 2018 on nineteen genotypes of chrysanthemum. Genotypes namely 'UHFSChr111', 'UHFSChr113', 'UHFSChr114', 'UHFS-Chr115', 'UHFSChr117', 'UHFSChr118', 'UHFSChr120', 'UHFSChr121', 'UHFS-Chr122', 'UHFSChr123', 'UHFSChr124', 'UHFSChr125', 'UHFSChr126', 'UHFS-Chr128', 'UHFSChr129', 'UHFSChr130', 'UHFSChr131', 'UHFSChr132' including 'Surf' as check. The plants were planted in three replications in Randomized Block Design in open field conditions using FYM 5 kg/m^2 and half dose of nitrogen and full dose of phosphorus and potassium were also mixed in the soil at the time of bed preparation. The remaining half dose of nitrogen was applied 45 days after transplanting. Data were recorded in terms of different plant parameters viz., days taken for flowering, plant height (cm) recorded at the time of flowering and measured from bottom to tip of the plant, number of plants and flowers per plant, flower diameter (cm) and duration of flowering, flower weight per plant and flower weight per square meter. The data was subjected to analysis by using (Gomez and Gomez 1984).

Results and Discussion

The mean performance of nineteen genotypes is presented in Table 1 indicated significant variation among different genotypes. Plant height was found significantly varied among genotypes maximum was observed in 'UHFSChr114' (114.42 cm) and minimum was recorded in cultivar 'Surf' (44.03 cm).Plant height varied significantly some genotypes were taller in growth and some were less vigorous, this might be caused by varietal traits. The taller plant height could be due to increased photosynthetic capacity of plant. Similar variation in plant height was also observed by Khan *et al*., (2003), Dhiman (2003) and Prabhu *et al*., (2018).Genotype minimum was observed in cultivar 'Surf' (80.40 days) whereas, genotype 'UHFSChr129' (129.30 days) recorded maximum number of days taken to bud formation and similar variations were also reported by Hamalata *et al.,(*1992), Talukdar *et al.,(*1992) and Baskaran *et al.,* (2004) and Shabnam (2017). Minimum days taken to flowering was observed in cultivar 'Surf'(135.81 days) and maximum was observed in genotype 'UHFSChr129'(170.26 days). The present findings are in close conformity with earlier findings by Behra *et al.,(*2002) and Negi *et al.,* (2015).

Table.1

Genotype	Plant height(cm)	Days taken to bud formation	Days taken to flowering (days)	Plant spread (cm)	Duration of flowering (days)	Flower diameter (cm)	Number of stems per plants	Number of flowers per plant	Flower weight per plant (g)	Flower weight per square meter
UHFSChr 111	68.77	122.90	164.38	34.94	33.08	5.43	4.75	243.33	511.00	4599.00
UHFSChr 113	81.33	125.85	161.02	33.87	27.08	5.71	6.17	230.75	459.17	4132.50
UHFSChr 114	114.42	122.33	159.88	36.36	25.92	4.68	6.58	314.33	377.20	3394.80
UHFSChr 115	113.43	126.25	161.87	33.86	27.00	6.24	6.00	199.67	419.30	3753.38
UHFSChr 117	113.33	123.90	159.17	35.29	27.83	3.68	6.50	412.17	659.47	5941.88
UHFSChr 118	76.20	125.05	161.92	33.94	26.75	3.34	4.48	139.17	133.05	1197.48
UHFSChr 120	75.77	122.02	162.83	34.74	32.17	5.46	5.53	179.83	192.42	1731.75
UHFSChr 121	81.73	124.12	156.50	38.39	25.92	4.63	5.42	243.50	358.78	3228.98
UHFSChr 122	83.97	123.30	156.82	35.60	27.50	5.43	6.67	326.08	572.74	5154.64
UHFSChr 123	81.33	120.42	159.07	33.43	27.08	5.65	5.18	66.00	191.40	1722.60
UHFSChr 124	67.75	124.83	163.17	26.75	32.00	10.26	3.92	30.25	220.83	1987.43
UHFSChr 125	86.08	122.56	161.28	34.77	26.08	4.48	6.00	241.17	219.04	1971.15
UHFSChr 126	78.42	124.80	164.53	34.98	33.25	4.91	5.70	216.42	244.50	2200.50
UHFSChr 128	82.17	123.70	160.80	35.28	27.08	3.07	5.60	427.08	279.53	2515.66
UHFSChr 129	82.42	129.30	170.26	33.58	27.75	5.30	4.92	109.83	329.50	2965.50
UHFSChr 130	87.17	124.94	159.96	34.52	32.67	5.03	5.12	113.92	170.88	1537.50
UHFSChr 131	82.95	125.05	160.84	34.33	28.83	4.90	5.67	259.50	413.19	3718.73
UHFSChr 132	83.15	121.23	161.16	34.41	33.67	5.49	6.75	405.33	645.83	5812.50
Surf	44.03	80.40	135.81	34.06	32.33	6.42	4.18	114.58	733.30	6599.68
CD $_{0.05}$										
Genotypes (G)	114.42	0.33	1.57	1.79	1.45	0.33	0.61	16.240	30.48	275.93
Year (Y)	113.43	0.15	0.72	0.82	0.68	0.15	0.28	7.452	13.99	126.61
G X Y	113.33	0.67	3.14	3.59	2.90	0.66	1.22	32.480	60.96	551.87

Maximum flower duration was observed in genotype ‘UHFSChr126’ (35.42 days) and minimum was observed in genotype ‘UHFSChr125’(24.75 days) similar finding was also reported by Negi *et al.,* (1994), Arora *et al.,* (1999), Behra (2002) and Kameshwari *et al.,* (2013). Plant spread recorded significant different result was measured in N-S and E-W direction of different genotypes and data are presented in Table 1. Among different genotypes ‘UHFSChr121’ (38.39 cm) and minimum plant spread was recorded in genotype ‘UHFSChr124’ (26.75 cm). The variation in plant spread is a varietal trait and also governed by genetic makeup. These results were close conformity with the results reported by Arora *et al.,* (1999), Prakash *et*

al., (2018) in chrysanthemum. Flower diameter was found maximum in genotype 'UHFSChr124'(10.26 cm) and minimum was observed in genotype 'UHFSChr118'(3.34 cm)similar results were also reported by Talukdar *et al*., (1992). Number of side shoots per plant showed statistically significant difference among genotypes. Genotype 'UHFSChr132'(6.75) followed by 'UHFSChr122'(6.67) found maximum number of side shoots per plant and minimum was observed in genotype 'UHFSChr124'(3.92) similar variation was also reported by Barigdad *et al*., (1992), Baskaran (2004), Negi *et al*., (2015) and Kumar *et* ., (2017). Number of flower per plant was found maximum in genotype 'UHFSChr121' (38.39 cm) Maximum number of flowers per plant was recorded in genotype 'UHFSChr128' (427.08) followed by 'UHFSChr117' (412.17) and 'UHFSChr132' (405.33) and minimum was observed in genotype 'UHFSChr124' (30.25). Flower weight per plant was recorded at the time of plucking of it at harvest stage was found maximum in cultivar 'Surf' (733.30g) followed by 'UHFSChr117' (659.47g), and 'UHFSChr132'(645.83g) and minimum flower weight was recorded in genotype 'UHFSChr118'(133.05g). Flower weight per square meter was observed maximum in cultivar 'Surf' (6599.68g) followed by 'UHFSChr117' (5941.88g), 'UHFSChr132' (5812.50g) and 'UHFSChr111' (4599.00g). The variation in flower weight was attributed to genotype and environment influence and other management factors and also reported by Barigdad and Patil (1997), Talukdar *et al.,* (1999), Kumar *et al.,* (2017).

On the bases of flower weight it was concluded that genotype namely 'UHFSChr 117', 'UHFSChr111', 'UHFSChr132' including cultivar 'Surf'' were recommended for loose flower production.

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