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Varietal evaluation of chrysanthemum (*Dendranthema grandiflora* L.) under Prayagraj agro-climatic conditions

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Abstract

The present study entitled “Varietal evaluation of chrysanthemum (*Dendranthema grandiflora* L.) Under Prayagraj agro-climatic conditions” was made to identify the suitable variety for growing in Uttar Pradesh to meet the national demand. Fifteen varieties were laid out in Randomized block Design (RBD) with three replications during rabi 2019-20. In present experiment data were recorded for various characters viz., growth parameters, flower characteristics and yield parameters. Variety Kajole was found as elite variety for height (cm) 30DAP, 60DAP and 90DAP, Number of primary branches per plant and Number of secondary branches per plant, for Number of leaves per plant in comparison to other varieties. Geetanjali and Datymed was for Number of flowers per plant. Red purple (28.91t) was for Flower yield (t/ ha) in comparison to other varieties. At room temperature significantly extended period of self life was recorded in Red purple (12 days). Maximum B: C ratio was obtained in Red purple (1:7.88). Based on findings of this experiment, it is recommended that chrysanthemum variety Red purple should be used for commercial cultivation of chrysanthemum, although further studies may also be carried out for refinement for selection of best varieties from amongst these.

Keywords: Chrysanthemum, red purple etc.

Introduction

Chrysanthemum (*Dendranthema grandiflora* L.) is one of the most important flower crops grown commercially in India for cut and loose flowers and is also used for garden display. It is commonly known as Guldaudi, Autumn Queen or Queen of the East (Koley and Sarkar, 2013). It belongs to the family Asteraceae. It is native to Northern Hemisphere. Chrysanthemum is popular flower meaning Chryso – golden, anthos – flower, a leading flower crop grown in many parts of the world, chiefly Europe and Asia with a few in other areas. It is one of the most beautiful flowering plant referred to as “Queen of the East” and “Autumn flower”.

In India, chrysanthemum is grown commercially and it occupies third rank in area with 16.63 thousand ha. (Janakiram and Rao, 2001). It is mostly used in our country for making garlands, venis, bracelets, flower decoration and religious offerings (Bohra and Kumar, 2014). But, in South India mostly the yellow coloured flowers are preferred and grown as loose flowers for trade. Chrysanthemum is one of the most beautiful and perhaps the oldest flowering plant commercially grown in different parts of the world.

Its commercial cultivation is being done in states viz., Maharashtra, Rajasthan, Madhya Pradesh and Bihar and in places viz., Delhi, Kolkata, Lucknow, Kanpur and Allahabad mainly for the sake of decoration and participating in flower shows, with the help of pot grown plants. Chrysanthemums are mainly classified under two categories: Large flowered (standard type) and small flowered (spray type). Large flowered chrysanthemums which produce long, sturdy stems and good keeping quality are further classified into 13 classes which make it suitable for flower arrangement, cut flower production and as potted flowering plant for exhibition and decoration. The extra-large bloomed cultivars are used for exhibition value, bouquets, vase etc, whereas small flowered are mostly grown for loose flower and are classified into 10 classes. The standard type flowers fetch higher prices though their share in export market is less but spray types have smaller flower size and have major share in the world market. In International cut flower trade, chrysanthemum ranks next to rose (Bhattacharjee and De, 2003).

Nursery raising of chrysanthemum/Guldaudi: Nursery sowing is done by suckers or terminal cuttings (5-7 cm long). Nursery raised by suckers is planted in February-March while nursery by terminal cuttings (5-7 cm long) is planted in June-July.

Cuttings may be treated with Ceresan (0.2%) or Captan (0.2%) to prevent seedlings from damping off disease. Cuttings may be planted in sands in partial shade. Do not use unprocessed rooting medium like sand or badarpur because it will develop fungal infection. Do not use heavy and unprepared soil as it will carry diseases and stops drainage. Protect the seedlings from sun and irrigate in morning and evening. Do not plant the cuttings too deep. Rooting takes place in 2-3 weeks and cuttings will be ready for transplanting one month after sowing.

Transplanting of chrysanthemum/Guldaudi: Seedlings are transplanted 25-30 days after sowing at 4 leaf stage. Before transplanting seedlings are hardened by withholding water for 1-2 days or by exposing them gradually to sunlight. Transplanting is generally done either on a cloudy day or in the evening. Transplanting in the evening is good as the night cool temperature is beneficial for the establishment. Do not keep growing plants in shade as it needs at least 3 hours of sun light even in summer.

Pinching, desuckering and stacking in chrysanthemum/Guldaudi: Pinching is removal of tip of main branch and it is done to induce more lateral branches on plants and ultimately more flowers. Pinching is done 3-4 weeks after planting. Pinching may be done in end of August or beginning of September.

Desuckering: Removal of side suckers is called disbudding. Remove the side suckers periodically. It is very important in standard varieties (large flower varieties).

Materials and Method

Experimental site

The experiment was conducted during winter season of the year 2020-2021 in Departmental Research field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agricultural Technology and Sciences, Prayagraj. The area is situated on the South of Prayagraj on the right bank of Yamuna at Rewa road at a distance of about 6 km from Prayagraj city. It is situated at 25.8°N latitude and 81.50 °E longitudes on elevation of 98Meters from the sea level.

Climate and weather

The area of Prayagraj district comes under subtropical belt in the South East of Uttar Pradesh, which experience extremely hot summer and fairly cold winter. The maximum Temperature of the location reaches up to 46 °C – 48 °C and seldom falls as low as 4 °C 5 °C. The Relative humidity ranges between 20 to 94 per cent. The average rainfalls in this

area are around 1013.4 mm annually.

Results and Discussion

The present investigation was carried out for “Varietal evaluation of chrysanthemum (*Dendranthema grandiflora* L.) Under Prayagraj agro-climatic conditions” was made to study the performance of different varieties of chrysanthemum, to check the shelf life of different varieties of chrysanthemum and to work out the economics of various treatments. For this purpose, 20 cultivar were laid out in Randomized block Design (RBD) with three replications. These Varieties are Ajay, Vijay kiran, Datymed, Kajole, Anmol, Kaul, Red purple, Classic, Dolly orange, Atom joy, Geetanjali, Gulmohar, Flirt, Gauri and Teri. These varieties of chrysanthemum were planted during rabi 2020-21. In present experiment data were recorded for various characters, viz., (A) Growth parameters: Plant height (cm) 30, 60, 90 DAS, Number of primary branches per plant, Number of secondary branches per plant, Plant spread (cm) (East -West, North -South) and Number of leaves per plant (B) Flower parameter: Days to first flowering, Days 50% flowering, Flowering duration (days), Stalk length (cm) and Flower diameter (cm) (C) Yield parameters: Number of flowers per plant, Individual flower weight (g), Flower yield per plant (g/plant) and Flower yield (kg/ha). The results of the present work are presented under following headings.

Growth Parameter

Plant height (cm) 30, 60, 90 DAS, Number of primary branches per plant, Number of secondary branches per plant, Plant spread (cm) (East -West, North -South) and Number of leaves per plant.

Flower Parameter

Days to first flowering, Days 50% flowering, Flowering duration (days), Stalk length (cm) and Flower diameter (cm).

Yield Parameter

Number of flowers per plant, Individual flower weight (g), Flower yield per plant (g/plant) and Flower yield (kg/ha) were significant at 5% level of significance indicating presence of good amount of variability among the treatments for these characters. This indicated ample scope for varietal selection in freesia. Replications were non-significant for all the characters indicating good homogeneity among replications. This suggests that there is an ample scope to identify suitable variety to improve varietal performance in chrysanthemum.

Economics of Treatments

Table 1: Performance of different varieties of chrysanthemum for Plant Height (cm), Plant Spread (cm²) and Number of Primary Branches/Plant.

Variety Symbol	Variety Name	Plant Height (Cm)			Plant Spread (Cm ²)			Number Of Primary Branches/Plant		
		30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
V1	Ajay	46.42	55.71	66.85	48.3	55.55	66.66	4.01	4.13	4.38
V2	Vijay Kiran	54.89	65.87	79.04	45.83	52.7	63.24	7.82	8.06	8.54
V3	Datymed	47.32	56.79	67.42	54.27	62.41	74.89	7.06	7.28	7.72
V4	Kajole	72.32	86.79	102.48	44.3	50.95	61.14	10.92	11.26	11.94
V5	Anmol	61.03	73.23	87.88	32.9	37.84	45.41	7.69	7.93	8.41
V6	Kaul	59.97	71.96	86.35	31.87	36.65	43.98	4.8	4.95	5.25
V7	Red purple	13.08	15.7	18.84	38.13	43.85	52.62	7.89	8.13	8.62
V8	Classic	16.92	20.31	24.37	34.23	39.36	47.23	5.92	6.1	6.47
V9	Dolly orange	67.18	80.61	95.2	39.93	45.92	55.1	5.32	5.48	5.81
V10	Atom joya	49.24	59.09	70.91	34.57	39.76	47.71	6.24	6.43	6.82
V11	Geetanjali	16.72	20.07	24.08	32.81	37.73	45.28	5.6	5.77	6.12
V12	Gulmohar	64.79	77.74	93.29	27.17	31.25	37.5	6.69	6.9	7.31

V13	Flirt	50.62	60.74	72.54	37.52	43.15	51.78	6.28	6.47	6.86
V14	Gauri	15.98	19.18	23.02	41.12	47.29	56.75	6.37	6.57	6.96
V15	Teri	68.27	81.92	98.31	39.8	45.77	54.92	5.6	5.77	6.12
V16	Aparajita yellow	47	58	69	38	43.7	52.44	6.79	7	7.42
V17	Aparajita white	48	57	65.86	39	44.85	53.82	6.69	6.9	7.31
V18	Aditya	46	55.9	68	41	47.15	56.58	6.67	6.88	7.29
V19	Jaya	47	53	67	40	46	55.2	6.79	7	7.42
V20	Chitrasha	46.9	58	67	36.25	41.69	50.03	5.82	6	6.36
F-test		s	s	s	s	s	s	s	s	s
SE		0.590	0.92	1.11	51.776	0.42	0.48	0.782	0.43	0.44
C.D.		1.286	46.42	55.71	112.821	1.21	1.39	1.706	1.24	1.28

Table 2: Performance of different varieties of chrysanthemum for Number of Secondary Branches/Plant, Number of Leaves/Plant, Days of First Flowering and Days of 50% flowering

Variety Symbol	Variety Name	Number of secondary branches/Plant (cm)			Number of Leaves Per Plant	Days of 50%flowering	Day of First Flowering
		30 DAT	90 DAT	120 DAT	120 DAT		
V1	Ajay	6.01	6.2	6.57	20.67	111.91	67.02
V2	Vijay Kiran	11.74	12.1	12.83	40.32	108.1	71.32
V3	Datymed	10.12	10.43	11.06	36.4	113.73	74.37
V4	Kajole	16.39	16.9	17.91	56.32	112.89	72.12
V5	Anmol	11.54	11.9	12.61	39.65	75.13	71.23
V6	Kaul	7.21	7.43	7.88	24.77	121.19	71.13
V7	Red purple	11.83	12.2	12.93	40.67	99.35	73.4
V8	Classic	8.37	8.63	9.15	30.5	122.67	59.52
V9	Dolly orange	7.97	8.22	8.71	27.4	123.5	71.48
V10	Atom joya	9.36	9.65	10.23	32.15	80.03	71.44
V11	Geetanjali	8.39	8.65	9.17	28.83	126.56	62.56
V12	Gulmohar	10.04	10.35	10.97	34.5	120.81	66.5
V13	Flirt	9.42	9.71	10.29	32.35	89.49	68.01
V14	Gauri	9.55	9.85	10.44	32.83	81.61	74.28
V15	Teri	8.39	8.65	9.17	28.83	79.57	65.01
V16	Aparajita yellow	10.19	10.5	11.13	35	106	70
V17	Aparajita white	9.7	10	10.6	34.15	104	70
V18	Aditya	9.02	9.3	9.86	35	105	70
V19	Jaya	10.19	10.5	11.13	32.8	105	70
V20	Chitrasha	9.7	10	10.6	31.8	102	66.45
F-test		s	s	S	S	S	S S
SE		0.61	0.63	0.67	2.2	0.87	0.91
C.D.		1.78	1.83	1.94	6.39	2.51	2.65

Table 3: Performance of different varieties of chrysanthemum for Flowering Duration (Days), Flower Diameter (cm), Stalk Length (cm), Number Of Flower/Plant, Individual flower weight (g), Flower Yield/Plant (g), Flower Yield t/ha., C:B Ratio

variety symbol	Variety Name	Flowering Duration (Days)	Flower Diameter (cm)	Stalk Length (cm)	Number of Flower/Plant	Individual flower weight (g)	Flower Yield/Plant (g)	Flower Yield t/ha	C:B Ratio
V1	Ajay	32.31	4.82	28.05	55.75	4.23	82.33	9.15	1:2.5
V2	Vijay Kiran	30.94	4.9	37.07	76.95	2.86	106.07	11.79	1:3.22
V3	Datymed	30.6	9.51	35.43	128.41	1.84	92.09	10.23	1:2.79
V4	Kajole	26.86	6.53	33.19	124.93	2.35	91.86	10.21	1:2.78
V5	Anmol	30.6	5.51	18.12	84.21	3.06	77.05	8.56	1:2.33
V6	Kaul	23.8	5.64	30.7	28.11	2.86	124.22	13.8	1:3.76
V7	Red purple	35.31	2.41	37.91	77.29	2.35	260.22	28.91	1:7.88
V8	Classic	32.64	3.91	32.78	22.09	2.96	142.06	15.79	1:4.31
V9	Dolly orange	33.33	10.06	20.2	87.04	1.73	193.78	21.53	1:5.87
V10	Atom joya	29.38	4.69	25.13	55.75	1.84	67.05	7.45	1:2.03
V11	Geetanjali	41.16	3.37	28.81	130	2.45	65.83	7.31	1:1.99
V12	Gulmohar	37.74	4.55	32.31	122	2.04	104.31	11.59	1:3.16
V13	Flirt	35.44	7.41	15.38	14.51	2.55	122.47	13.61	1:3.71
V14	Gauri	38.15	4.79	15.85	61.3	3.09	122.42	13.6	1:3.71
V15	Teri	34.07	8.3	26.33	37.62	3.26	116.44	12.94	1:3.53
V16	Aparajita yellow	34	6	29	75	2.7	120	14	1:3.81
V17	Aparajita white	32.1	5.5	28	74	2.7	119	13	1:3.54
V18	Aditya	33	5.5	27.1	73.65	2.6	118	13.4	1:3.65
V19	Jaya	35	6	28	73	2.6	117	13.1	1:3.57
V20	Chitrasha	30	5.8	27	73	2.55	115.4	12	1:3.27
F-test		S	S s	s	s	s	s	s	
SE		0.4	0.14	0.39	55.75	0.05	0.99	0.11	
C.D. at 5%		1.16	0.4	1.12	76.95	0.13	2.88	0.32	-

Conclusion

On account of acquired results, variety Kajol was found as elite variety for height (cm) 30DAP, 60DAP and 90DAP, Number of primary branches per plant and Number of secondary branches per plant, for Number of leaves per plant in comparison to other varieties. Geetanjali and Datymed was for Number of flowers per plant. Red purple (28.91t) was for Flower yield (t/ ha) in comparison to other varieties. At room temperature significantly extended period of self-life was recorded in Red purple (12 days). Maximum B: C ratio was obtained in Red purple (1:7.88). Based on findings of this experiment, it is recommended that chrysanthemum variety Red purple should be used for commercial cultivation of chrysanthemum, although further studies may also be carried out for refinement for selection of best varieties from amongst these.

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