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## Studies on propagation of different chrysanthemum (*Chrysanthemum morifolium* R.) varieties by terminal cuttings under Konkan agro-climatic condition

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### Abstract

An investigation entitled “Studies on propagation of different chrysanthemum (*Chrysanthemum morifolium* R.)” was conducted at College of Horticulture, Dapoli, Dist. Ratnagiri during the year 2020-2021. The experiment was laid in Randomized Block Design with three replications and eight treatments. From the present research on propagation studies of chrysanthemum, among the various varieties propagated through terminal cuttings ‘Veena’ was found to be promising under Konkan Agro-climatic condition with respect to survival percentage, girth at collar, plant height, number of roots, length of root, fresh weight of root, dry weight of root, fresh weight of shoot and dry weight of shoot.

**Keywords:** Chrysanthemum, cuttings, varieties

### Introduction

Chrysanthemum (*Chrysanthemum morifolium* R.) which belongs to the family Asteraceae. The word chrysanthemum is derived from Greek word ‘*chryos*’ means ‘golden’ and ‘*anthos*’ means ‘flower’ (Subhendu *et al.*, 2005) [7]. It is grown throughout the world commercially for cut and loose flowers as well as pot plants. Chrysanthemum cut flowers are popular for flower arrangements because of their long vase life. In different states of India, it is grown with different names, Guldaudi in Hindi belt, Chandramalika in the eastern state, Samanti in the southern states and Shevanti in the western states.

Chrysanthemum is having beautiful charming flowers with an excellent vase life. Chrysanthemum is versatile flower with a wide range of types, sizes and colours. It can be planted in the bed, cultured in the pot, used for garland making and also as cut-flower for flower arrangement. Chrysanthemum is not only a source of beautification but also a flower that has extremely useful medicinal characteristics. Chrysanthemum has its origin from northern hemisphere chiefly Europe and Asia. In India Chrysanthemum is mainly grown in Karnataka, Bihar, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu. In Maharashtra it is mainly grown in Pune and Ahmednagar. Chrysanthemum are herbaceous perennial plant having fibrous root system (shallow rooted plant), and is very sensible to water logged conditions. It is growing to about 50-150 cm tall. Chrysanthemum blooms are divided into thirteen different bloom forms by the U.S National Chrysanthemum society. Chrysanthemum is attractive short day flowering plant blooming in late autumn. Commercially chrysanthemum is propagated by terminal cuttings.

It is necessary to study different varieties of chrysanthemum which could be multiplied within short span of time. Therefore, the present investigation was carried out for propagation studies on chrysanthemum under Konkan agro-climatic conditions.

### Material and Methods

The research was conducted at Hi-Tech nursery of College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri (M.S.). The experiment was carried out in randomized block design with three replication with eight treatments included T<sub>1</sub>:Veena, T<sub>2</sub>:Liliput, T<sub>3</sub>:Bidhan Rupanjali, T<sub>4</sub>:Vijay, T<sub>5</sub>:Red Bouquet, T<sub>6</sub>:Charlie, T<sub>7</sub>:Basanti and T<sub>8</sub>:Jessica. The cuttings were collected on 2<sup>nd</sup> fortnight of October from healthy plant in the morning between 8.00 am to 10.00 am. The cuttings were given a slant cut using sharp secateurs and planted in Protrays with respective treatments and need base irrigation was given to the cuttings at the interval of 2-3 days.

Statistical analysis of the data was collected during the course studies was carried out by standard method of analysis of variance described by Panse and Sukhatme (1995) [3].

## Result and Discussion

### Survival percentage (%)

Maximum survival percentage was recorded in variety T<sub>1</sub>Veena (90.70%) and minimum survival percentage was recorded in T<sub>5</sub> Red Bouquet (81.10%). Maximum survival percentage was recorded in variety T<sub>1</sub>'Veena' propagated through terminal cuttings. This investigation proves that maximum survival percentage in variety 'Veena' may be due to its genetic character and the prevailing environment of Konkan must be suitable for maximum survival of terminal cuttings.

### Plant height (cm)

Maximum plant height (10.74 cm) was recorded in variety T<sub>1</sub>Veena and minimum plant height was recorded in variety T<sub>2</sub> Liliput (9.33 cm). Differences in the plant height can be due to genetic composition and carbohydrate content in cuttings of different chrysanthemum cultivars. (Suvija *et al.* 2016) [8].

### Number of leaves

Maximum number of leaves was observed in variety T<sub>6</sub> Charlie (10.89) and minimum number of leaves in variety T<sub>5</sub> Red Bouquet (9.17). The number of leaves differs as per the height of the plant. The vegetative characteristics of different cultivars are greatly influenced by genetic factors. Lucidos, (2013) [2]. Similar results were found by Renuka, (2012) [5] in the cv. 'Keiro' in carnation.

### Length of leaf (cm)

Maximum length of leaf was observed in variety T<sub>6</sub> Charlie (3.88 cm) whereas, the minimum length of leaf (2.28 cm) was observed in variety T<sub>7</sub> Basanti. Length of leaves differed from cultivar to cultivar and it may be due to the genetic makeup of the plant. Similar results were found by (Renuka, 2012) [5] in the cv. 'Soto' in carnation.

### Breadth of leaf (cm)

Maximum breadth of leaf was observed in variety T<sub>6</sub> Charlie (1.97 cm) whereas, the minimum breadth of leaf was observed in variety T<sub>7</sub> Basanti (1.23 cm).

### Average leaf area (cm<sup>2</sup>)

Maximum average leaf area (12.87 cm<sup>2</sup>) was recorded in variety T<sub>6</sub> Charlie and minimum average leaf area was recorded in variety T<sub>7</sub> Basanti (6.40cm<sup>2</sup>).

### Girth at collar (mm)

Maximum girth at collar was observed in variety whereas, the minimum girth at collar was observed in variety T<sub>3</sub> Bidhan Rupanjali at (1.28 mm). Thicker girth of shoot indicated that

these cultivars have higher capacity of storing reserve food material. This might be due to differences in the genetic constitution as well as carbohydrate content in different cultivars of chrysanthemum (Shohe *et al.* 2016) [6].

### Number of roots

Maximum number of roots (21.01) was recorded in variety T<sub>1</sub>Veena and minimum number of roots was recorded in variety T<sub>5</sub> Red Bouquet (10.68).

### Length of root (cm)

Maximum length of root (10.24 cm) was recorded in variety T<sub>1</sub>Veena and minimum length of root was recorded in variety T<sub>8</sub> Jessica (6.55 cm). The cuttings of 'Veena' might have higher amount of internal stored carbohydrates and other root promoting factors as compared to other varieties, which results the maximum root length. Differences in root length among varieties may be attributed due to genetic composition and carbohydrate content of cuttings. Root length was maximum due to mobilization of reserve food material, elongation of meristematic cells and differentiation of cambial initials into root primordia. (Younis and Riaz, 2005) [9].

### Fresh weight of root (g)

Maximum fresh weight of root was recorded in variety T<sub>1</sub>Veena (2.71 g) and minimum fresh weight of root was recorded in variety T<sub>5</sub> Red Bouquet (1.47 g). Due to production of more number of roots, the absorption of water and nutrients from the medium was more resulting in enhanced growth adding to increased weight of roots. Similar results were found by Prince *et al.* (2017) [4] in the variety 'Bizet' in carnation.

### Dry weight of root (g)

Maximum dry weight of root was recorded in variety T<sub>1</sub>Veena (0.91 g) and minimum dry weight of root was recorded in variety T<sub>5</sub> Red Bouquet (0.29 g).

### Fresh weight of shoot (g)

Maximum fresh weight of shoot was recorded in variety T<sub>1</sub>Veena (5.47 g) and minimum fresh weight of shoot was recorded in variety T<sub>5</sub> Red Bouquet (3.58 g). The differences in the fresh weight of shoot may be due variation in their genetic composition. (Kumar *et al.* 2017) [1].

### Dry weight of shoot (g)

Maximum dry weight of shoot was recorded in variety T<sub>1</sub>Veena (1.89 g) and minimum dry weight of shoot was recorded in variety T<sub>5</sub> Red Bouquet (1.08 g).

### Shoot: Root Ratio

Maximum shoot:root ratio was recorded in variety T<sub>5</sub> Red Bouquet (2.43) and minimum shoot:root ratio was recorded in variety T<sub>8</sub> Jessica (1.85).

**Table 1:** Varietal response propagated by terminal cuttings on growth parameters of chrysanthemum

Treatments	Survival percentage (%)	Plant height (cm)	Number of leaves	Length of leaf (cm)	Breadth of leaf (cm)	Leaf area (cm <sup>2</sup> )	Girth at collar (mm)
T <sub>1</sub> :Veena	90.70	10.74	10.43	3.74	1.74	12.26	1.52
T <sub>2</sub> :Liliput	86.69	9.33	10.38	2.35	1.28	7.35	1.40
T <sub>3</sub> :Bidhan Rupanjali	88.83	9.44	10.36	2.53	1.25	8.49	1.28
T <sub>4</sub> :Vijay	88.89	10.51	10.39	2.54	1.62	8.85	1.48
T <sub>5</sub> :Red Bouquet	81.10	9.37	9.17	3.27	1.41	10.74	1.39

T <sub>6</sub> :Charlie	89.01	10.54	10.89	3.88	1.97	12.87	1.49
T <sub>7</sub> :Basanti	89.38	10.56	10.42	2.28	1.23	6.40	1.35
T <sub>8</sub> :Jessica	89.87	10.65	10.56	2.46	1.34	8.77	1.36
Mean	88.05	10.14	10.32	2.88	1.48	9.46	1.40
S.Em.±	0.01	0.21	0.21	0.20	0.10	0.20	0.03
C.D.@ 5%	0.04	0.63	0.65	0.61	0.31	0.62	0.09

**Table 2:** Varietal response propagated by terminal cuttings on growth parameters of chrysanthemum

Treatments	No. of roots	Length of root (cm)	Fresh wt. of roots (g)	Dry wt. of roots (g)	Fresh wt. of shoot (g)	Dry wt. of shoot (g)	Shoot: Root Ratio
T <sub>1</sub> :Veena	21.01	10.24	2.71	0.91	5.47	1.89	2.01
T <sub>2</sub> :Liliput	11.71	7.21	2.13	0.43	4.14	1.10	1.94
T <sub>3</sub> :Bidhan Rupanjali	12.75	7.24	2.34	0.46	4.64	1.14	1.98
T <sub>4</sub> :Vijay	12.95	7.63	2.40	0.51	4.70	1.26	1.96
T <sub>5</sub> :Red Bouquet	10.68	6.85	1.47	0.29	3.58	1.08	2.43
T <sub>6</sub> :Charlie	13.84	7.87	2.54	0.65	4.87	1.40	1.91
T <sub>7</sub> :Basanti	16.22	8.75	2.59	0.68	4.92	1.41	1.89
T <sub>8</sub> :Jessica	10.69	6.55	2.70	0.89	5.00	1.43	1.85
Mean	13.73	7.79	2.36	0.60	4.66	1.33	1.99
S.Em.±	0.20	0.09	0.07	0.06	0.21	0.01	0.02
C.D.@ 5%	0.61	0.28	0.21	0.18	0.62	0.04	0.07

**Conclusion**

Among the various varieties propagated through terminal cuttings 'Veena' was found to be promising under Konkan Agro-climatic condition with respect to survival percentage, girth at collar, plant height, number of roots, length of root, fresh weight of root, dry weight of root, fresh weight of shoot and dry weight of shoot.

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