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ROOTING CAPACITY OF CHRYSANTHEMUM CUTTINGS BY USING DIFFERENT TYPES OF GROWING MEDIA

Ajish Muraleedharan, K. Sha, S. Kumar, J.L. Joshi* and C. Praveen Sampath Kumar*

Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai nagar-608002 (TN.), India.
* Department of Genetics and Plant Breeding, Faculty of Agriculture,
Annamalai University, Annamalai nagar-608002 (Tamil nadu) India.

Abstract

Chrysanthemum is one of the most popular cut flower in the world belongs to the family Asteraceae. They are native to Asia and Northeastern Europe. It is the second most popular flower next to rose. Chrysanthemums start blooming early in the autumn. This plant is commonly propagated by cuttings, plant division and by seeds. Physiological status of chrysanthemum cuttings during rooting process highly influences plant growth and flower production. Among other aspects, rooting capacity of the cuttings is the most important factor. Rooting capacity is influenced by environmental conditions such as growing medium and nutrients. The study was aimed to analyse the effects of different types of rooting media on the rooting capacity of chrysanthemum cuttings. Parameters observed were rooting capacity and cutting performances such as cutting height, cutting diameter, number of leaves, number of visible roots and root length at 10^{th} and 20^{th} days after planting. The results showed that chrysanthemum cuttings planted in coco peat was found to be the best which produced better rooting capacity as indicated by higher number of visible root, number of leaves and by higher root length followed by rice husk.

Key words: chrysanthemum, growing media.

Introduction

Chrysanthemum (*Dendranthema grandiflora*) is one of the major cut flowers in the world trade. It is the second most popular flower next to rose. There are 40 wild species and thousands of varieties of chrysanthemums are available. The varieties can differ in size, colour and number of flowers per stem. Flower of chrysanthemum is a compound inflorescence. It consists of many individual flowers called florets. Florets in the center of the flower is called disk florets which possess stamens and pistil. The compound inflorescence is an array of several flower heads, or sometimes a solitary head. They have alternately arranged leaves divided into leaflets with toothed or occasionally smooth edges. Chrysanthemum produce tiny seeds that drop to the ground and germinate. Germination commonly takes place upto three weeks in a warm and sunny location with damp soil conditions. The plant has the ability to grow from stem cuttings. Each cutting should be minimum 5 inches long and have some foliage so that photosynthesis can occur and each cutting produce energy to generate roots. The fast and dynamic trend changes in the floriculture market have made quality and performance as the determining factors in grading and pricing. This is in addition to the consumer preferences on color, size and flower types. However, chrysanthemum cut flowers produced by traditional growers have poor physical performance and quality due to lack of good planting material and cultivation method, therefore their prices become uncompetitive and less profitable. The rooting capacity is not only determined by the genotype, but also by environmental conditions (Horridge and Chockshull 1989). For optimal growth of plants, media must contain enough water, air and mainly with good physical and chemical properties. Favorable environment conditions which facilitate good rooting process of the cuttings are physical environments and edaphic factors that may act solely or simultaneously to the cuttings in root initiation and further root growth (Mass and Anderson, 1975 and Pal and Rajeevan, 1992).

Materials and Methods

The experiment was conducted at Department of Horticulture, Faculty of Agriculture, Annamalai University on November 2018. chrysanthemum cuttings of 5-9 cm

Table 1: Data recorded at 10th day after planting on rooting capacity and performances of cuttings.

Rooting medium	Cutting height	Cutting diameter	Number of leaves	Number of visible root	Root length	Shoot fresh weight
Rice husk	10.79	1.74	2.34	11.56	2.83	1..87
Coco peat	11..48	2.01	2.69	12.34	3.16	2.13
Perlite	10.91	1.38	2.01	10.93	2.18	2.01
Vermiculite	10.72	1.29	1.93	11.03	1.99	1.65
Sand	10.04	1.02	1.39	8.89	1.13	1.02
Garden soil	10.92	1.39	2.21	10.92	1.92	1.29
S.Ed.	0.24	0.07	0.10	0.23	0.07	0.10
CD (P=0.05)	0.49	0.15	0.21	0.47	0.15	0.21

long purchased from a farmer cultivating chrysanthemum in kurinjippadi village, Cuddalore dist, Tamilnadu were planted in black grow bag of 5 × 7 cm size and one cutting planted in each bag. Variety used in the investigation was Co 1 having yellow coloured flowers. The experiment was designed in randomized block design with three replications. The treatment consist of six different rooting media, *i.e.* rice husk, coco peat, perlite, vermiculite, sand and garden soil. The rooting media was removed and the rooting capacity and performances of the cuttings were recorded at 10th and 20th day. Parameters evaluated were cutting height, cutting diameter, number of leaves, number of visible root, root length and shoot weight.. To facilitate the humidity for the cuttings, water was sprayed to each planting bags before the cuttings were planted and kept in shade house. Observations were recorded at 10th and 20th day of rooting period.

Results and Discussion

Rooting media significantly affect the rooting capacity and performance of the cuttings after planting. Chrysanthemum cuttings planted in coco peat produced better rooting capacity as compared with other growing mediums on the 10th and 20th days followed by rice husk and least rooting was observed in sand medium (Table 1 and 2). The higher number of visible roots and longer roots of the cuttings grown on coco peat may be attributed with its better physical characteristics, aeration and water holding capacity are probably the most important factors, while among the chemical characteristics, nutritional status and salinity level have a crucial role on plant development (Dewayne *et al.*, 2003; Singh *et al.*, 2003). Under such favourable condition, the plant was provided sufficient air and oxygen for cell respiration during the rooting process (Frenck and Kim, 1995). The bulk density and particle density decreased with increase of coco peat and this might be due to lighter weight of coco peat and increased porosity (Strojny and Nowak, 2003).

Coco peat can hold large quantities of water, just like a sponge. It can be used as a replacement for traditional peat in soil mixtures or as a soilless substrate for plant cultivation (John Mason, 2003). For optimal growth of plants, media must contain enough water, air and mainly with good physical and chemical properties. Most of the light weight, soilless media are combinations of two or more components formulated to achieve desirable physical and chemical properties. The moisture in smaller pores served not only for metabolic activities but also provided sufficient humidity to avoid excessive transpiration (Karlsen, 1997) and destructive temperature fluctuation that may happen in the rhizosphere (Klapwijk, 1987).

Coco peat had been considered as a renewable sphagnum peat substitute for the use in horticulture (Pisanu *et al.*, 1994; Yau and Murphy, 2000; Henry and Norman, 2001). Noguera *et al.*, (2000) studied the importance of coco peat as a growing medium due to its high porosity (95%), nutritive value and slightly acidic nature. The coco peat has a bulk density of 0.1 g/c and a particle density of 1.3 g/c with 96% porosity. Lower bulk density and particle density of the coco dust based media as compared to other medium was observed by Wilson *et al.*, (2002). The pH of 100% coco peat medium is slightly acidic and most of the ornamental crops prefer acidic pH. Abad *et al.*, (2002) recorded the pH of 4.9-6.14 for different sources of coir dust.

Table 2: Data recorded at 20th day after planting on rooting capacity and performances of cuttings.

Rooting medium	Cutting height	Cutting diameter	Number of leaves	Number of visible root	Root length	Shoot fresh weight
Rice husk	11.79	1.95	5.12	21.14	6.03	2.11
Coco peat	13.38	2.31	5.49	22.01	6.86	2.38
Perlite	12.91	1.78	5.01	20.57	5.26	2.23
Vermiculite	12.72	1.71	4.38	19.67	4.98	1.98
Sand	10.21	1.27	3.13	16.84	4.11	1.32
Garden soil	11.92	1.78	4.30	18.59	4.72	1.87
S.Ed.	0.27	0.09	0.12	0.54	0.14	0.08
CD (P=0.05)	0.55	0.18	0.25	1.12	0.29	0.16

Conclusion

Form the research work carried out it should be concluded that coco peat was found to be the best type of rooting medium for chrysanthemum cuttings

which produced better rooting capacity as indicated by higher number of visible root, higher root length and number of leaves. This may be due sufficient air and oxygen supply by the coco peat medium for cell respiration during the rooting process, aeration and water holding capacity are probably the most important factors while, among the chemical characteristics, nutritional status and salinity level have a crucial role on root development.

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