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Effect of different media treatments on rooting of carnation (*Dainathus cryophyllus* L.) cuttings of cv. BALTICO under poly house conditions

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ABSTRACT : The present experiment was conducted to study the effect of media on rooting of carnation cuttings of cv. BALTICO under poly house conditions, during September, 2011 to March, 2012 and the experiment was conducted in Randomized Block Design. All the media treatments studied recorded superior rooting parameters over control. Among the media treatments studied red earth + coco peat recorded minimum number of days for root initiation, maximum percentage of rooting, cumulative root length, maximum fresh weight of roots and percentage of establishment of rooted cuttings followed by coco peat + vermicompost and vermicompost alone. Media in combination recorded maximum rooting percentage, cumulative length of roots and fresh weight of roots over individual media treatments studied.

KEY WORDS : Carnation, Cocopeat, Pressmud, Red earth, Rooting, Vermicompost

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The demand for ornamental flowers is ever increasing in international and domestic market with the improvement in standard of living and quality of life. Among the cut flowers, carnation is preferred by growers to rose and chrysanthemum as they have long vase life. Carnation cultivars have high heterozygosity and must be vegetatively propagated (Mii *et al.*, 1990). Carnations are vegetatively propagated by soft wood cuttings. These are made from the soft green succulent new growth. Year round propagation can be done in carnations provided temperature inside the polyhouse is maintained at 20°C with 75-80 per cent relative humidity. Rooting is obtained in 25-30 days with manual misting in a polythene chamber (Chadha, 2001).

Among different factors governing root development, media plays a very important role, it holds the cuttings in position, provide them with the moisture and aeration. An ideal rooting medium should be porous

enough to allow good aeration and should possess high water holding ability. The type of rooting medium to some extent determines the nature of roots produced on the cutting (Nanda and Kochhar, 1985). Hence, the experiment was conducted to standardise the media for rooting of carnation cuttings.

RESEARCH METHODS

The experiment was conducted at commercial floriculture farm, Mudimyal, Rangareddy district, A.P. during September, 2011 to March, 2012 under naturally ventilated poly house. During the period of study the minimum and maximum temperatures recorded was 18-30°C and the relative humidity fluctuated between 59-88 per cent. In the present study cuttings were taken from the carnation cv. BALICO and were planted in rooting media *viz.*, red earth, coco peat, vermicompost and pressmud individually and their combinations (red earth

+ coco peat, red earth + vermicompst, red earth + pressmud, coco peat + vermicompost, coco peat + pressmud, vermicompost + pressmud in 1:1 ratio) and control (sand). The experiment was laid out in Randomized Block Design with 11 treatments and 3 replications and 30 cuttings were taken per replication.

The terminal cuttings of 10-15 cm length with 2-4 pairs of leaves were taken from mother plants of current season's growth. A sharp slant cut was given at planting position below the node in order to get more area for better rooting. Cuttings were planted in polytrays and kept in polyhouse. Each poly tray can accommodate 40 cuttings so, three poly trays were taken per treatment. Cuttings were watered regularly with rose can to maintain the moisture in the medium. Biometric observations recorded were number of days taken for formation of root initials, percentage of rooting, number of roots per cutting, length of longest root, cumulative length of roots, and fresh weight of roots these were recorded twice at an interval of 15 days, for recording the observations 5 cuttings were selected randomly in each replication. The survival percentage of cuttings planted for rooting was recorded 30 days after transplanting and the data were statistically analysed.

Statistical analysis :

The obtained data was analyzed by statistical significant at $P < 0.05$ level, S.E. and C.D. at 5 per cent

level by the procedure given by (Panse and Sukhatme, 1994).

RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Number of days taken for formation of root initials:

Among the media treatments studied red earth + coco peat (9.02 days) recorded minimum number of days for root initiation followed by coco peat + vermicompost (9.60 days) and vermicompost alone (10.03 days). Red earth + coco peat might have maximum pore space and aeration which favoured early root initiation. The media in combination with coco peat recorded minimum number of days for root initiation. Similar results were reported by Zalewska and Wozny (2004), they recorded early root initiation of *Pelargonium* cuttings when planted in media containing 30 per cent of coconut fibre. The early root initiation with coco peat were also confirmed by Khewale *et al.* (2005), in carnation. However, maximum number of days for formation of root initiation was recorded with control (16.70 days) (Table 1).

Percentage of rooting :

All the media treatments recorded significantly

Table 1 : Effect of media on rooting of carnation (<i>Dianthus caryophyllus</i> L.) cuttings of cv. BALTICO under poly house conditions						
Treatments	Number of days	Percentage of establishment (%)	Number of roots per cutting	Cumulative length of roots (cm)	Fresh weight of roots(g)	Percentage of establishment (%)
Red earth	10.40	80.70	13.10	138.89	3.11	71.89
Cocopeat	10.10	84.27	13.54	169.13	3.64	77.63
Vermicompost	10.03	89.03	14.02	180.72	4.28	81.15
Pressmud	10.93	73.30	9.70	84.62	2.28	62.67
Red earth + cocopeat	9.02	97.37	16.33	238.52	5.71	87.72
Red earth + vermicompost	10.10	84.00	12.49	134.07	3.63	75.50
Red earth + pressmud	10.30	79.58	12.04	116.89	2.90	72.27
Cocopeat + vermicompost	9.60	91.29	14.71	198.54	4.61	83.32
Cocopeat + pressmud	10.17	81.87	13.73	166.35	3.95	75.21
Vermicompost + pressmud	10.63	77.67	11.32	98.06	2.48	68.66
Control-sand	16.70	50.47	7.47	40.42	1.03	52.23
Mean	10.73	80.87	12.59	142.38	3.42	73.48
C.D. (P=0.05)	0.28	2.60	0.13	2.31	0.05	0.91

superior rooting percentage over control. Among the media treatments red earth + cocopeat (97.37 %) recorded maximum percentage of rooting followed by cocopeat + vermicompost (91.29 %) (Table 1). As the soil contain adequate organic matter that improves the soil structure, enables to retain moisture and variety of micro-organisms that support root growth, which might be the reason for maximum percentage of rooting. Results are in confirmatory with the reports of Thomas *et al.* (2003), they reported maximum rooting percentage of carnation cuttings in soil alone media. Lowest percentage of rooting was observed with control (50.47 %). Minimum percentage of rooting was recorded with control. It might be due to poor water holding capacity of sand.

Number of roots per cutting :

Treatment red earth + cocopeat (16.33) recorded maximum number of roots per cutting followed by cocopeat + vermicompost (14.71) and vermicompost alone (14.02) (Table 1). Among the media treatments studied vermicompost based media treatments recorded relatively superior number of roots per cutting. Edwards and Neuhauser (1988), reported that vermicompost has maximum pore space, aeration and water holding capacity has ability to supply nutrients in available form such as nitrate nitrogen and soluble phosphorus, which are necessary for root growth. That might have resulted in maximum number of roots. Similar results were reported by Shirol *et al.* (2001) in dwarf poinsettia, they recorded maximum root development with vermicompost + sand (1:1), followed by vermicompost alone. These reports were in confirmatory with Mahale *et al.* (2002) and Bharathy *et al.* (2003) in carnation.

Cumulative length of roots per cutting :

The treatment red earth + coco peat (238.52 cm) recorded maximum cumulative length of roots followed by coco peat + vermicompost (198.54 cm). Among the different media treatments studied pressmud alone (84.62 cm) recorded lowest cumulative root length which was however superior over control (40.42 cm) (Table 1). Pressmud like other organic material effect the physical and chemical properties of the soil (Tandon, 1995). However, Joshi and Sharma (2010) reported that due to its bulky nature and wax content it usually gives a less benefit with direct application in the fields. Similar results were reported by Bhosale *et al.* (2012), they studied the

physico-chemical characteristics of pressmud and reported that pressmud is a spongy, amorphous, waxy material which on addition to soil improves the physical properties of soil such as water holding capacity but on direct use it has less benefit.

Fresh weight of roots per cutting :

Media in combination recorded highest fresh weight of roots over individual media treatments, among these combination media treatments studied, red earth + coco peat (5.71g) recorded highest fresh weight of roots followed by cocopeat + vermicompost (4.61g) (Table 1). It might be due to lacuna of one media may be compensated by the characteristic property of other media. As soil which has poor drainage properties might have compensated by good aeration and porosity character of coco peat. The results are in confirmatory with the reports of Kumar *et al.* (2011) in patchouli cuttings, they recorded highest fresh weight of roots with soil, river bed silt and FYM in equal ratio.

Percentage of establishment of rooted cuttings :

Highest percentage of establishment of rooted cuttings was recorded with red earth + coco peat (87.72 %) followed by coco peat + vermicompost (83.32 %) and vermicompost alone (81.15%) (Table 1). However, lowest percentage of establishment of rooted cuttings was recorded with control (52.23%). Cuttings planted in red earth+ coco peat media recorded maximum number of roots, cumulative root length and fresh weight of roots which might have resulted in the highest percentage of establishment of rooted cuttings. Barreto and Nookaraju (2007) recorded superior percentage of establishment of *in vitro* grape plant lets when planted in coco peat in combination with soil. Gurjar and Patle (2007), also recorded highest survival percentage when hard wood cuttings of pomegranate were planted in soil+ sand+ leaf mould media.

From the above results it can be concluded that all the media treatments recorded significantly superior rooting parameters over control. Among the treatments, media in combination recorded superior rooting parameters over individual media treatments. Red earth+ coco peat recorded minimum number of days for root initiation, maximum percentage of rooting, number of roots per cutting and maximum fresh weight of roots followed by coco peat + vermicompost. Coco peat in combination with other media recorded maximum

cumulative length of roots and percentage of establishment of rooted cuttings. Press mud alone or in combination with other media studied recorded poor rooting parameters, however, significantly superior over control.

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