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PROPAGATION OF CARNATION AS INFLUENCED BY DIFFERENT ROOTING MEDIA

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ABSTRACT

The propagation studies on carnation carried out during various seasons of 2001 and 2002 with nine different rooting media revealed that sand is the best rooting medium for the induction of rooting in carnation cuttings and their subsequent survival in the field as compared to other media. The higher water holding capacity of all the other media with higher or low pH values had adversely affected the induction of rooting in carnation cuttings and their survival in the field. The percentage of root formation was found to be more during rainy and spring season with a fair amount mortality in the former season. Spring season seems to be the viable alternative for propagation of carnation under high humid conditions.

INTRODUCTION

Carnation is an important cut flower and is mainly propagated by cuttings. Although practical knowledge of its propagation is accumulating steadily but much of the earlier work is related to the chemical treatments (Shiver, 1967, Hartley et al., 1978 and Juga, 1963) which are not always readily available or even necessarily applicable, elsewhere due to variation in climatic conditions. Moreover, the products generally preferred for potting media are peat, vermiculite and other manufactured materials, which are expensive and hardly available in hill conditions. Therefore, local materials which are bit cheaper and easily available to rural and tribal masses of north eastern hill region, are tried in the present study to find out a suitable time and medium for its rapid multiplication.

MATERIALS AND METHODS

The experiment was conducted during spring (March-April), rainy (July-August) and winter seasons (November-December) during 2001 and 2002 at experimental farm of ICAR Research Complex for NEH Region, Sikkim Centre, Tadong, Gangtok. The treatments consisted of nine rooting media viz. soil, sand, burnt rice husk, moss grass, leaf mould, soil+sand (1:1), burnt rice husk+sand (1:1), moss grass+sand (1:1), leaf mould+sand (1:1) during each of three seasons. These media were filled in pots of 25 cm size and were disinfected by drenching of bavistin @ 0.2% one week before the insertion of cuttings into the media. Since the outside weather is very inclement for propagation of carnation, the experiment was, therefore, laid out in net house following completely randomized block design. Fresh cuttings with 3 or 4 nodes were prepared every time from the terminal portion of healthy stock plant. The basal end of cutting was treated with 500 ppm NAA solution by quick dip method. Twenty cuttings were planted in each treatment replicated thrice. The cuttings were taken out after one month of planting and recorded for various observations. These rooted cuttings were then transplanted individually in the pots for testing the field establishment by counting the established cuttings after one month of transplanting and expressed as percentage. The physical and chemical properties of different media were determined by standard procedure as outlined by Black (1965) Table-1.

RESULTS AND DISCUSSION

The success regarding root initiation and development indicated that the rooting response of cutting varied with the medium and season of planting (Table 2). In rainy season maximum number of roots (28.67) was recorded when the cuttings were set in leaf mould (M_5) while least (4.40) were recorded in moss grass (M_4). The same trend was observed during spring and rainy season but the root formation was comparatively

better in spring than in winter season irrespective of their rooting medium. In spring, maximum number (22.85) of roots was recorded when the cuttings were set in the medium burnt rice husk (M_3) and it was significantly superior to all other medium within the season. These findings are in agreement with those of Gill and Arora (1988) in carnation and Manish Kapoor et al. (2000) in lilies.

As far as root growth is concerned, the rooting media M_5, M_9, M_4, M_8, M_2 and M_6 produced significantly greater root length as compared to other medium and this effect was much more pronounced when the cuttings were planted during winter season. Thus the longest root (21.46 mm) was recorded in leaf mould (M_5) during winter season while shortest root (2.07mm) was observed in soil (M1) during rainy season followed by those planted in spring season (3.00mm). With the increase in number and length of root, thickness of root was reduced and, in general, soil (M_1) produced the thickest root.

Sand as medium for rooting of carnation cutting significantly influenced the rooting percentage than all other rooting media except its combination with burnt rice husk which was found at par (Table-3). Moss grass had given low percentage of rooting (21.82-35.48%) which was closely followed by soil (33.76-52.20%) during various seasons under study. However, the cutting prepared during rainy season resulted in highest rooting success as compared to those prepared during spring and winter season. This could be due to non-vigorous condition of the plant and prevailing high temperature during warmer months. Similar results have also been reported by Pessala (1972).

The establishment of rooted cutting in different media exhibited almost cent per cent establishment (Table 3). This indicated that there was not much problem in the establishment after proper rooting. The cutting rooted in sand or its combination with soil or burnt rice husk, established better (100%) than that of other media during spring season. Higher percentage of survival (100%) was also recorded in sand and burnt risk husk alone and their combination as well during winter season. Least survival (50.00-800.11%) among different medium was found during rainy season due to high humidity that was very conducive for various fungal and bacterial disease. Hartley et al. (1978) and Juga (1963) also reported similar findings.

Mortality of a fair number of cuttings was also noticed in the media with high water holding capacity during all the seasons (Table 1 and 3). The higher pH (8.08) and low water holding capacity (12.48) of sand seems to have promoted the root induction with least mortality. Since higher moisture is conducive for the fungal and bacterial infections, the low water retention in sand was with higher pH might have inhibited the pathogens to cause diseases. Pergola et al (1979) also reported that higher pH was effective to inhibit the development of wilt disease in carnation.

Though, higher pH was also found in the media M_3, M_7, M_9, M_4, and M_8 but their water holding capacity was much higher than that of sand (M) which adversely affected the root formation and their establishment in the field (Table 1). Similarly, media (soil) with low pH value and higher moisture contents had also adversely affected the rooting and their subsequent establishment in the field. The low survival of carnation cuttings from media with low pH was also reported by Riehl (1965).

REFERENCES

Black, C.A. (1965). Methods of soil analysis. II Ed. Amer. Soc. Agronomy, U.S.A.

Cheever, D.W. (1967), Rooting of carnation cuttings. *Bull. Colo. Flower Grs' Ass.*, No. 206, pp. 1-6.

Gill, A.P.S. and Arora, J.S. (1988). Performance of carnation under sub tropical climatic conditions of Punjab. *Indian J. Hort.* 45 (3&4) : 329-335.

Hartley, D.E. Hanan, J.J. and Stevens, D. (1978). Rooting trials with Carnations, *Bull. Colo. Flower Grs' Ass.*, No.331, pp. 3-4.

Juga, M. (1963). Rooting of carnation cutting in the glasshouse. *Grand. Via Liv.*, 12(2) : 53-54.

Pergola, G. Gouda, C. Dalla and Garibaldi, A. (1979). Fusarium wilt of carnation : effect of soil pH and nitrogen source on disease development. *Meded. Vande Fac. Landbauw. Rijksuniv. Gent.* 44 (1) : 413-420.

Pessala, T. (1972). Carnation planting density and the influence of temperature of growing medium, *Puutarka.*, 75(10) : 498-500.

Riehl, G. (1965). Rooting of cuttings and pH value. *Ziierpflazenbau,* 5:161-162.

Manish Kapoor, Grewal, H.S. and Arora, J.S. (2002). Effect of media on propagation of *Lilium., J. Orna. Hort.* 3(1) : 58-59.

Table 1.Physical and chemical properties of different rooting media

Rooting medium (M)	pH	Water holding capacity(%)
M1-Soil	5.20	32.84
M2-Sand	8.08	12.84
M3-Burnt rice husk	8.24	38.61
M4-Moss grass	7.61	261.13
M5-Leaf mould	6.94	72.00
M6-Soil+sand	5.88	56.42
M7-Sand+burnt rice husk	8.00	35.94
M8-Moss grass+sand	7.48	54.18
M9-Leaf mould+sand	7.74	46.40

Table 2. Effect of media on root initiation and development of carnation cutting in different seasons

Treatment	Number of root precutting			Root length (mm)		
(M)	Spring	Rainy	Winter	Spring	Rainy	Winter
M1	12.22	15.21	8.09	3.00	2.07	4.31
M2	15.31	18.26	10.31	7.26	6.18	8.44
M3	22.85	23.11	15.26	4.40	3.11	6.15
M4	6.61	9.64	4.40	8.17	7.64	9.20
M5	20.00	28.67	20.00	16.24	11.30	21.46
M6	14.44	17.20	11.36	5.28	4.47	7.26
M7	10.20	14.56	9.80	4.67	3.15	6.00
M8	13.78	17.00	11.45	7.46	5.36	11.18
M9	16.41	19.12	13.32	10.00	7.50	16.74
C.D.(5%)	2.74	3.02	3.24	3.24	2.04	2.18

Table 3. Effect of media on rooting and establishment of carnation cutting in different seasons

Treatment	Rooting (%)			Survival (%)		
(M)	Spring	Rainy	Winter	Spring	Rainy	Winter
M1	45.14	52.20	33.76	92.21	74.28	95.10
M2	85.08	90.00	72.13	100.00	80.11	100.00
M3	64.21	73.34	46.76	98.14	74.25	100.00
M4	30.00	35.48	21.82	73.33	50.00	76.24
M5	52.84	60.00	39.14	84.20	63.38	81.36
M6	61.11	68.15	51.70	100.00	70.00	97.15
M7	89.58	96.74	68.85	100.00	76.17	100.00
M8	45.31	52.34	36.20	82.19	58.48	80.08
M9	61.00	71.46	54.00	91.11	64.13	93.33
C.D.(5%)	17.81	15.74	16.82	12.21	9.84	10.46