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Functional Performance of Media on Clonal Proliferation of 'Gold Crest' (*Cupressus macrocarpa* Hartw.)

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Abstract

An investigation was carried out during 2019-20 to study the effect of different media under mist chamber on rooting of cuttings in Gold Crest' (*Cupressus macrocarpa*) under the humid zone condition of Thally, Krishnagiri districts of TamilNadu, India. The experiment was laid out in Completely Randomized Design (CRD) with 3 replications, including four treatments of various composition of media's viz., Sand, Cocopeat, 1:1 (v/v) ratio of sand + Cocopeat and control (Pot mixture) in polybags. The data were recorded on 115th day of planting. Outcome of the present research work revealed that the highest rooting percentage (87.77%) and Survival percentage (80%) was recorded in the media composition of sand + cocopeat treatment. The highest number of roots (5.33) and Root length (17.40 cm) also reported in the media composition of sand + cocopeat treatment. The highest days for sprouting (127.33) of new growth were recorded in Sand treatment. Hence, it can be concluded that the media composition of Sand + Cocopeat treatment was found to be superior in terms of Rooting percentage, Survival percentage, Number of roots and Root length followed by the media of Cocopeat treatment using apical shoot cuttings.

Keywords: *Gold crest, Rooting of cuttings, Sand, Cocopeat, Pot mixture*

1.Introduction:

Monterey cypress (*Cupressus macrocarpa*), a tree species belongs to cypress family, native to the Central Coast of California, is employed as ornamental in landscaping and pottery due to its excellent adaptability and appearance. *Cupressus macrocarpa* is a medium-sized conifer, grows to heights of up to 40m in perfect growing conditions, and its trunk diameter can reach 2.5m. The foliage grows in dense sprays, bright green in color. The leaves are scale-like, 2–5 mm long, and produced on rounded (not flattened) shoots; seedlings up to a year old have needle-like leaves 4–8 mm long. The seed cones are globose to oblong, 20–40 mm long, with 6-14 scales, green at first, maturing brown about 20–24 months after pollination. The pollen cones are 3–5 mm long, and release their pollen in late winter or early spring.

Asexual propagation plays vital role pertaining to develop true-to-type offspring and for tree improvement by the forest breeders (Zobel and Talbert, 1984). Clonal propagation facilitates the selection and proliferation of superior genotype in uniform, with superior growth, adapted to adverse ecological conditions, especially to propagate a clone resistant or tolerant to Cypress canker (Seiridium cardinale). There are many factors such as climate, media, mother plant etc., acts a key for successful multiplication of a plant. There is little published information on propagation of this species. The present study investigates the variation in the stem cuttings rooting ability among different media composition.

2. Materials and methods

The present investigation was conducted at Horticulture Research and Training Centre (HR&TC), Department of Horticulture and Plantation Crops, Thally, Krishnagiri districts of Tamilnadu, during the period of 2019 and 2020. The experiment was laid out in Completely Randomized Design (CRD) with 3 replications, including four treatments of various composition of media's viz., Sand (T1), Cocopeat (T2), Sand + Cocopeat in 1:1

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(v/v) ratio (T3), and control (Pot mixture-1:1:1 ratio of sand+red soil+cocopeat) (T4). Apical Shoot cuttings of 20 cm length with minimum 3-4 nodes were collected from healthy mother plants during the month of June, available in the institute. A slant cut was given at the basal end. The basal end (2.5- 3.0 cm) of the cuttings was dipped for 15 minutes with 2 % humic acid solutions. Then, the treated cuttings were planted vertically in different composition of sterilized inert media in polybags under mist chamber to promote rooting. All cuttings were maintained under mist chamber and watered regularly. Relative humidity in the mist chamber was maintained at ≥ 85 % and temperature at 28±20C. Further observations were recorded from 115th days after planting (DAP) on various root parameters such as days taken for sprouting, rooting percentage (%), number of roots per cutting and root length (cm). Survival percentage (%) of the rooted cutting was recorded at 150th DAP. The inference was drawn after comparing the calculated F values with the tabulated F values at 5 % (P= 0.05) level of significance. The estimates of mean, variance and standard error were done as per Panse and Sukhatme (1978).

3. Results and Discussion

All the parameters showed significance among the treatment, as shown in Table.1 and Fig.1. Minimum days for sprouting was recorded in T3 (Sand + Cocopeat treatment) (117.67 days), followed by T2 (Cocopeat) (125.33 days). On comparing with T4 - control (135.67 days). It assures that the treatment of cuttings with the media composition of Sand + Cocopeat treatment induce rooting of cutting much faster than other treatment. On examining after 115th DAP, the higher rooting percentage was recorded in Sand + Cocopeat media (87.77%), followed by cocopeat (77.77%) which are on par with each other. Number of roots per cutting (5.33) and root length (17.40 cm) was recorded maximum in Sand + Cocopeat treatment.

On observing survival percentage after 150th DAP, all the media composition shows higher survival percentage than control (Pot Mixture). In all parameters the treatment control was recorded the minimum value among the treatments. The production of roots in the control group may be caused by endogenous auxin, which might influence and play important role for root primordia formation in the cuttings (Hossain and Urbi, 2016).

The periods usually for rooting of Cupressus sempervirens cuttings are 3 (Panetsos, 1993) to 4 months (Capuana and Lambardi, 1994). However, no experiments have been conducted to study the optimal duration of rooting required for this species. The experiment by Jordanov (1992), who obtained up to 60% rooting of Cupressus sempervirens cuttings, taken from 15 year old donor plant, by keeping them in the rooting bed for 220 days, suggested that the duration of the rooting period could be of key importance for the species. According to Hartmann and Kester (1983), when rooting narrow-leaved evergreens, best results may be expected if the cuttings are taken during the period from late fall to late winter. Browse (1985) recommended the same period of year particularly for the genus Cupressus and Lamb Kelly and Bowbrick (1985) even specified.

Table 1: Mean performance of Effect of different Media on rooting of *Cupressus macrocarpa*

Treatments	**Days for sprouting**	**Rooting percentage (%)**	**Number of roots per cutting**	**Root length (cm)**	**Survival percentage (%)**
T_1 - Sand	127.33	75.55	4	13.67	**62.22**
T_2 - Cocopeat	**125.33**	**77.77**	**4.67**	**17.37**	**65.55**
T_3 - Sand + Cocopeat	**117.67**	**87.77**	**5.33**	**17.4**	**80**
T_4 - Pot Mixture (Control)	135.67	58.89	3.33	8.83	50
Mean	**126.5**	**60.64**	**4.33**	**14.32**	**53.85**
SE.d	**3.94**	**3.87**	**0.58**	**1.29**	**5.24**
CD at 5%	**9.10****	**9.94****	**1.33***	**2.98****	**12.08***

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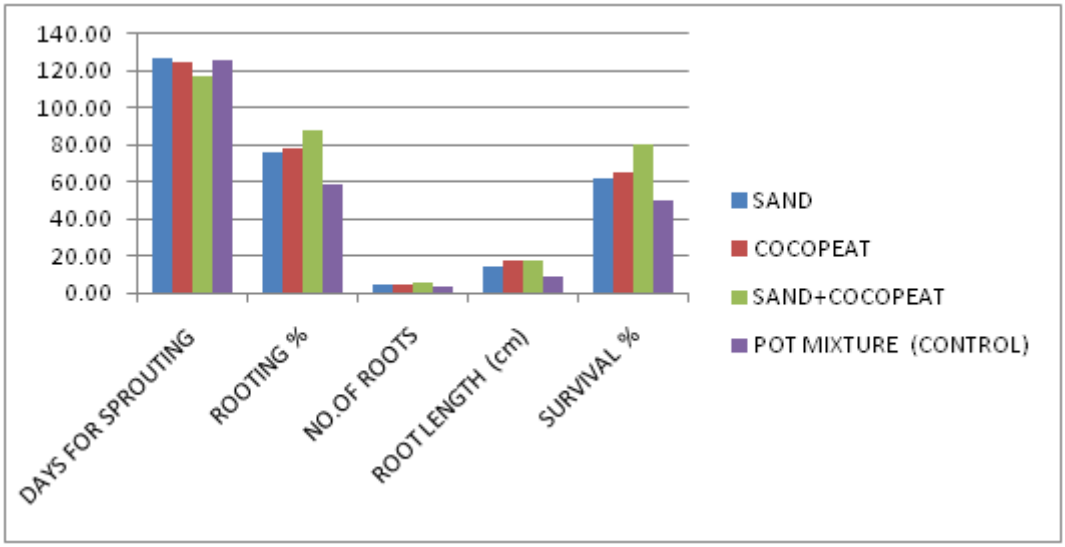
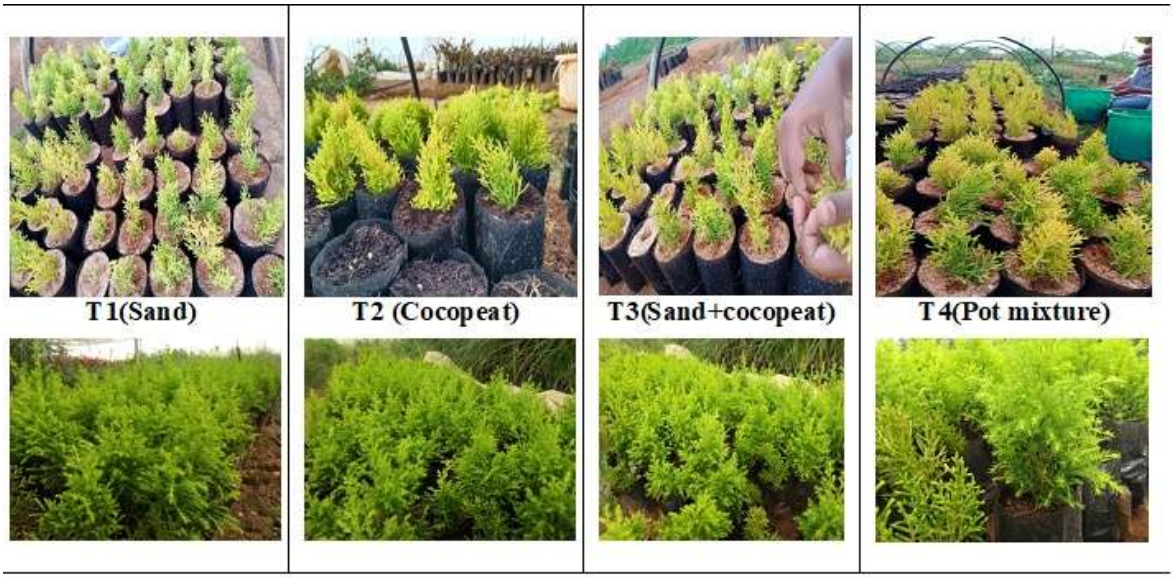
Fig.1 Graphical representation of effect of rooting media





4. Conclusion

On the basis of results obtained from this experiment we conclude that, the rooting and survival capacity of apical shoot cuttings of *Cupressus macrocarpa*under mist chamber conditions, can be improved by dipping (15 minutes) of basal portion of cuttings on 2% humic acids and utilizing media composition of Sand + Cocopeat in 1:1 (v/v) ratio. The second best media given good result is cocopeat alone in the polybags.

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