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Effect of Growing Media on Rooting and Growth of Patchouli (*Pogostemon cablin*) Cuttings in Subtropical Humid Region of Arunachal Pradesh

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Abstract

An experiment was conducted to assess the effect of different growing media on rooting and seedling growth of patchouli cuttings. Among different growing media viz. soil, riverbed silt and FYM in different combinations, an equal ratio of all above gave the highest (98.8%) survivability. It also produced significantly superior seedling quality in terms of basal girth of the stem, number of leaves, plant height, shoot dry weight, root length and root dry weight.

Key words : Patchouli, Rotting media, Survivability, Seedling growth.

Patchouli (Pogostemon cablin (Blanco) Benth. ; Family : Labiatae) is one of the essential oil bearing plant. Patchouli oil is extensively used in manufacture of deodorant, high grade scents, flavored food products, cosmetics, toiletries, various types of scented soaps, creams, agarbatties, repellents, anti-rheumatic product and in aromatherapy (1). It is also known to possess anti-fungal properties and is being used to combat skin infections, dandruff and eczema. Indonesia supplies almost 80% of the global demand of patchouli oil (2). Patchouli adapts itself to a wide range of soil and climatic conditions. However, it thrives best in loose and friable deep loamy soils, rich in humus and nutrients with moderately acidity (pH 5.5 to 6.2). The plant flourishes in low altitudes and foothills of tropical and subtropical humid region with evenly distributed rainfall ranging from 1500—3000 mm per annum. The agro-climatic requirements of patchouli are matching with that of valleys of Arunachal Pradesh. Patchouli can be commercially propagated by stem cuttings and the growing media has greater importance in the rooting and production of quality planting stock. There are evidences of potting mixture effecting the growth and vigor of seedlings due to differential uptake of available nutrients and moisture (3). Therefore, it is imperative to determine the growing media for providing seedlings with the best morphological attributes. Information on the effect of growing media towards the establishment and growth of patchouli seedlings is scarce. Hence, the present investigation was carried out to determine the most suitable growing media for production of quality planting stock of patchouli.

Methods

The present study was conducted during October—December, 2009 at College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh. Semi-hard branches from healthy mother plants of patchouli were taken for preparation of cuttings. Uniform sized cuttings with three nodes were prepared and immediately dipped in the water to avoid the water losses through evaporation. Thereafter, the lower end of cuttings were dipped into rooting hormones (viz. siradex) and were planted in poly bags filled with different growing media viz. soil (T_1), riverbed silt (T_2), FYM (T_3), soil + riverbed silt (1 : 1) (T_4), soil + FYM (1 : 1) (T_5), riverbed silt + FYM (T_6), soil + river silt + FYM (1 : 1 : 1) (T_7). Five replicates each of 100 cuttings were maintained for each treatment. These poly bags were placed under partial shade and irrigation was given as and when required. The data for survival percent was recorded after 20 days of planting. Whereas, after two months of planting, ten plants from each replication were taken to study the average

Table 1. Effect of different growing media on survival (%), basal girth of stem (mm), number of leaves, plant height (cm), shoot dry weight (g/plant), root length (cm) and root dry weight (g/plant) of patchouli seedlings. Figures in parentheses are arc sine transformed values.

Growing media	Survival (%)	Basal girth of the stem (mm)	Number of leaves per plant	Plant height (cm)	Shoot dry weight (g/ plant)	Root length (cm)	Root dry weight (g/ plant)	Root to shoot ratio
T_1 = Soil	82.40 (68.28)	3.92	9.70	12.55	0.57	18.86	0.35	0.61
T_2 = River bed silt	98.40 (86.71)	3.66	9.50	12.30	0.53	17.53	0.28	0.53
T_3 = FYM	48.60 (44.16)	4.06	11.40	14.65	0.53	21.40	0.40	0.75
T_4 = Soil + River bed silt (1 : 1)	93.60 (75.94)	3.64	10.20	12.60	0.71	18.25	0.29	0.41
T_5 = Soil + FYM (1 : 1)	78.80 (62.94)	4.15	10.70	14.30	0.68	19.21	0.48	0.71
T_6 = River bed silt + FYM (1 : 1)	75.20 (60.36)	4.26	12.00	14.15	0.72	21.08	0.52	0.72
T_7 = Soil + River bed silt + FYM (1 : 1 : 1)	98.80 (87.16)	4.47	12.40	13.95	0.77	22.98	0.57	0.74
CD (0.05)	10.13	0.59	2.61	1.75	0.13	4.18	0.11	0.26
CV (%)	9.34	11.16	18.43	9.95	15.83	16.07	19.76	29.60

basal girth of the stem, number of leaves per plant shoot length and root length. Average shoot dry weight and root dry weight from each replication were also taken. The data were statistically analyzed using randomized block design (4).

Results and Discussion

Highest survival percentage i.e. 98.8% was recorded when soil, river bed silt and FYM were used in equal proportion as growing media (T_7), which was statistically at par with river bed silt (T_2) and equal mixture of soil and river bed silt (T_4) (Table 1). However, when FYM alone (T_3) was used as rooting media, survivability of patchouli cuttings tremendously reduced, which is attributed to seedling rot caused by *Pythium*, *Phytopthora*, etc. Highest basal girth of stem (4.47 mm), Number of leaves (12.40), shoot dry weight (0.77 g), root length (22.98 cm) and root dry weight (0.57 g) per plant were recorded in T_7which was followed by T_6 and T_5. This is because equal proportion of soil, river bed silt and FYM improved the soil structure and texture making the media more friable and porous which consequently improved both aeration and water holding capacity. It also reduced the bulk density of media which favored root growth and canopy development properly. This is in accordance to the results reported by Maithani et al. (5) and Shukla et al. (6). FYM resulted in highest plant height (14.65 cm) which was at par with T_5, T_6 and T_7. Venkatesh et al. (7) also reported better plant height in *Pterocarpus marsupium* when mixture of soil, sand and FYM was used as the rooting medium. The highest root to shoot ratio (0.75) was observed in T_3, which was at par with T_7, T_6, T_5, T_1 and T_2. This might be attributed to the better growth and development of root system resulting in comparatively more uptake of water and available nutrients. Similar results were also observed by Bahuguna et al. (8).

Thus it may be concluded that equal ratio of soil, river bed silt and well decomposed FYM can be used for better root and shoot development and consequently for production of the best quality planting material of patchouli.

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