



# Effect of Different Potting Media on Sprouting, Survival and Growth Performance of *Bougainvillea* (*Bougainvillea* spp.) Cuttings

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## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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## ABSTRACT

The present investigation on "Effect of different potting media on *bougainvillea* (*Bougainvillea* spp.) cuttings" was carried out during academic year 2023-24 at College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, India. The experiment was laid down in Randomized Block Design (RBD) replicated thrice with eight treatments. The maximum number of sprouts (3.10), sprouting percentage (95.00), survival percentage (88.33), plant height (56.76 cm), relative growth rate (0.0068 cm/cm/day) were recorded in treatment T8 i.e. Soil + Sand + FYM + Vermicompost (1:1:1). The combination of soil, sand, FYM, vermicompost showed better performance for sprouting, survival and growth parameters.

**Keywords:** *Bougainvillea*; potting media; relative growth rate; sprouting; survival.

## 1. INTRODUCTION

*Bougainvillea* (*Bougainvillea* spp.) is a vibrant and iconic flowering shrubby vine native to south America, popularly cultivated in tropical and subtropical regions worldwide. It imparts beauty to garden and belongs to the family Nyctaginaceae. It flourishes well everywhere and even in heavily polluted areas of large cities and industrial towns and that's why it called as 'Glory of the Garden' [1]. Because of its greater tolerance for varying agroclimatic conditions and its wide range of recurrent blooming habits, *bougainvillea* is a valuable commercial plant in the nursery industry. *Bougainvillea* has a well-established aesthetic value in landscaping and commercial potential as a container plant. Any area can be transformed into a vibrant landscape by using *bougainvillea*. Given its resilient nature and free flowering behavior, *bougainvillea* is an easy choice for any landscape.

Use of different types of rooting media having different characteristics is important for quality rooting in cuttings. Growing media is an essential material for the production of high quality plants grown in containers. Problems of nursery growing plant which relate to the growing media are often due to physical characteristics of the media. A good rooting medium should hold the cuttings in place during rooting period, provide moisture, permit exchange and provide appropriate light penetration. Plants grown in growing media composed of mix of cocopeat, vermicompost, farm yard manure, sand etc. will exhibit higher growth rates compared to plants grown in traditional media. Properties of good soilless growth media should have high porosity, stability of organic matter, good water holding capacity, must retain sufficient moisture, aeration, optimum pH (5.0-6.5) and EC (0.6 dms/cm<sup>2</sup>) for polybag plants[2].

## 2. MATERIALS AND METHODOLOGY

**Study Area:** The experiment was conducted during the year 2023-24 from May-November at College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra.

**Experimental Design:** The experiment was conducted in the Randomized Block Design with eight treatments and three replications.

**Planting Material:** The planting material i.e. of *bougainvillea* hardwood cuttings of 15 cm length of pencil size thickness were selected prior to planting.

**Eight Different Growing Media Were Used:** T1 Soil, T2 Soil + Sand + FYM (1:1:1), T3 Soil+Sand + Rice husk (1:1:1), T4 Soil + Sand + Cocopeat (1:1:1), T5 Soil + Sand + Vermicompost (1:1:1), T6 Soil + Sand + FYM + Rice husk (1:1:1:1), T7 Soil + Sand + FYM + Cocopeat (1:1:1:1), T8 Soil + Sand + FYM + Vermicompost (1:1:1:1). Potting mixtures were prepared with different proportions of media on volume basis and trichoderma was added at the rate 10g per 100 kg. Then as per the treatments, the mixture filled in polythene bags of size 9" x 11". A slanting cut was given at the base of the cuttings and each cutting had about three to four buds. A transverse cut was given at top of each cutting. For keradix powder treatment, the basal end of the cutting was dipped in water and later dipped in keradix powder taken in a beaker. Then the treated cuttings were planted in polybags (9" x 11") containing media as per treatments.

**Data Collection:** There are five plants selected for observation. Number of sprouts and sprouting percentage recorded at 60 days after cutting. Survival percentage recorded at 180 days after cutting. Plant height (cm), relative growth rate

(cm/cm/day) were recorded at 30 days interval up to 180 days after cutting.

**Data Analysis:** The data obtained in the present investigation were statistically analysed by the method suggested by Panse and Sukhatme [3].

### 3. RESULTS AND DISCUSSION

#### 3.1 Number of Sprouts

All treatment indicate significant difference with respect to number of sprouts (Table 1). The highest number of sprouts (3.10) found in treatment T8 (soil + sand + FYM + vermicompost) which was at par with treatment T7 (2.80) and T6 (2.73). While lower number of sprouts recorded in treatment T1 (2.00). During investigation the maximum number of sprouts observed in soil + sand + FYM + vermicompost (1:1:1:1) combination which might be due to potting media and environmental factors had significant influence on sprouts developed in cuttings and presence of growth promoting factors in vermicompost and FYM which helped in better utilization of stored carbohydrates, nitrogen and other factors. Similar findings was reported by Kapre et al. [4] for cape jasmine in media soil + FYM + rice husk, Minj et al. [5] for *bougainvillea* in soil + sand + cocopeat media.

#### 3.2 Sprouting Percentage

The statistically highest per cent sprouting (Table 1) was found in treatment T8 (95.00) (soil + sand + FYM + vermicompost) which was at par with T6 (93.33), T7 (91.67), T4 (90.00) and T5 (88.33). While lowest per cent sprouting observed

in treatment T1 (83.33). Potting media and the weather condition during experimental period was important for increasing cell the activity for formation of root. Maximum sprouting percentage observed in media containing soil + sand + FYM + vermicompost might be due to FYM and vermicompost contain bioactive principles and balanced composition of nutrients for sprouting and root initiation of cutting. All these factors contributed for sprouting [6].

Similar findings obtained by Kamruzzaman and Quadir [7] in sand for *bougainvillea*, Kumar et al. [8] in soil + sand + vermicompost media in pomegranate.

#### 3.3 Survival Percentage

The highest per cent survival of plants (Table 1) in treatment T8 (88.33) (soil + sand + FYM + vermicompost) which was at par with T6 (86.67), T7 (85.00), T4 (81.67) and T5 (83.33). While lowest per cent sprouting observed in treatment T1 (75.00). In present investigation media combination i.e. soil + sand + FYM + vermicompost (1:1:1:1) might have provide physical conditions and sufficient nutrients to cuttings particularly for better metabolic and physiological activities along with better development of root system. Maximum number of roots with higher length and thickness absorb more nutrients and water from the soil and resulted in maximum percentage of survival [9]. The results are in conformity with the findings of Rahman et al. [10], Mehmood et al. [11], Singh et al. [12].

**Table 1. Effect of different potting media on sprouting parameters and survival percentage of *bougainvillea* (*Bougainvillea* spp.) cuttings**

Treatments	Number of sprouts (60 DAC)	Sprouting percentage (60 DAC)	Survival percentage (180 DAC)
T1	2.00	83.33	75.00
T2	2.27	86.67	80.00
T3	2.06	85.00	76.67
T4	2.06	90.00	81.67
T5	2.37	88.33	83.33
T6	2.73	93.33	86.67
T7	2.80	91.67	85.00
T8	3.10	95.00	88.33
<b>Mean</b>	<b>2.42</b>	<b>89.17</b>	<b>82.08</b>
<b>Range</b>	<b>2.00- 3.1</b>	<b>83.33-95.00</b>	<b>75.00-88.33</b>
<b>'F' test</b>	<b>SIG</b>	<b>SIG</b>	<b>SIG</b>
<b>S.Em. ±</b>	<b>0.19</b>	<b>2.41</b>	<b>2.28</b>
<b>C.D. at 5 %</b>	<b>0.56</b>	<b>7.31</b>	<b>6.92</b>

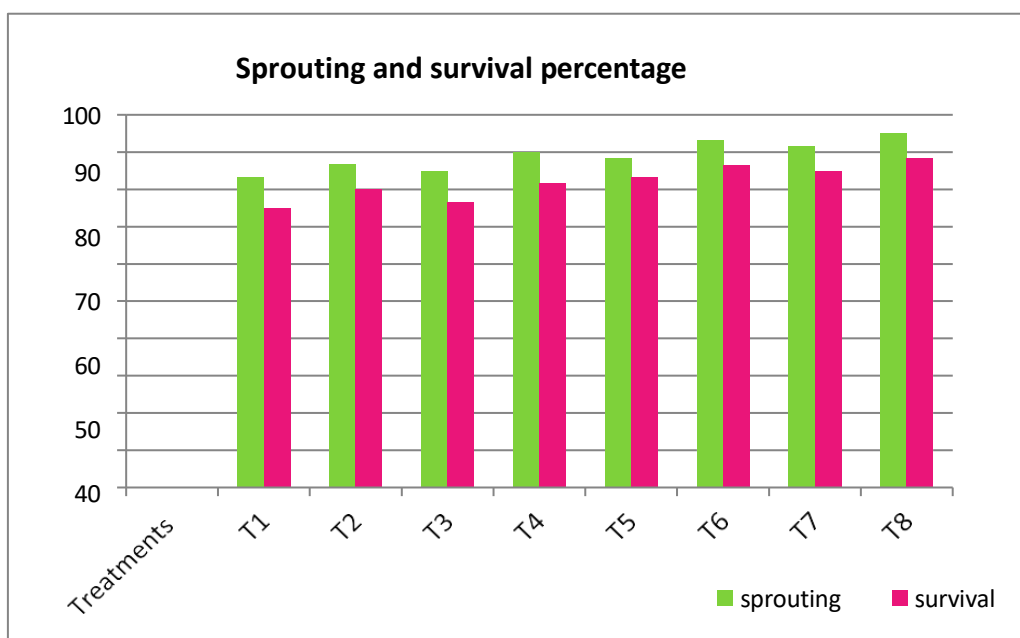


Fig. 1. Effect of different potting media on sprouting and survival percentage of *bougainvillea* (*Bougainvillea* spp.) cuttings

Table 2. Effect of different potting media on plant height (cm) and relative growth rate (cm/cm/day) of *bougainvillea* (*Bougainvillea* spp.) cuttings at 180 days after cutting

Treatments	Plant height (cm)	Relative growth rate (cm/cm/day)
T1	40.60	0.0046
T2	45.13	0.0044
T3	41.09	0.0035
T4	46.55	0.0041
T5	47.97	0.0055
T6	51.43	0.0053
T7	50.94	0.0053
T8	56.76	0.0068
<b>Mean</b>	<b>47.56</b>	<b>0.0049</b>
<b>Range</b>	<b>40.60-56.76</b>	-
<b>'F' test</b>	<b>SIG</b>	-
<b>S.Em. ±</b>	<b>1.11</b>	-
<b>C.D. at 5 %</b>	<b>3.37</b>	-

### 3.4 Plant Height

The maximum plant height (Table 2) was found in treatment T8 (56.76 cm) (soil + sand + FYM + vermicompost) and followed by treatments T6 (51.43 cm) and T7 (50.94 cm) which was found superior over rest of the treatments. The lowest plant height was recorded in treatment T1 (40.60 cm). Plant height is the most important morphological character of plant. In present investigation, it was found that different media had significant effect on height of cuttings. The media containing FYM and vermicompost

produced the highest plant height. It might be due to vermicompost and FYM play important role to improve physical and chemical properties of rooting media by improving its water holding capacity, aeration, organic matter mineralization and solubilisation and availability of micronutrient permitted gaseous exchange between roots and atmosphere which might have increased the growth of cuttings producing more length of shoots. Similar results were also recorded by Seifeldin and Samah [13] in (silty soil 75 per cent + compost 25 per cent) for bougainvillea, Minj et al. [5] (soil + sand + cocopeat) for bougainvillea.

### 3.5 Relative Growth Rate on Height Basis (cm/cm/day)

The highest relative growth rate on height basis (Table 2) recorded in treatment T8 (0.0068 cm/cm/day) (soil + sand + FYM + vermicompost) and lowest relative growth rate on height basis observed in treatment T3 (0.0035 cm/ cm/day) (soil + sand + FYM). The maximum relative growth rate on height basis observed in media containing FYM and vermicompost. The combination provides excellent structures, porosity and nutrients in available form such as nitrate nitrogen and soluble phosphorus it might be main reasons for excellent plant growth. The results are in conformity with the findings of Bendre et al. [14] in soil + rice husk + compost (2:1:1) in bush pepper, Khedkar et al. [15] in soil + FYM (3:1) in cashew graft.

### 4. CONCLUSION

From present investigation it can be concluded that among different treatment combination, T8 (soil + sand + FYM + vermicompost) (1:1:1:1) treatment combination recorded the maximum number of sprouts (3.10), sprouting percentage (95.00), survival percentage (88.33), plant height (56.76 cm), relative growth rate (0.0068 cm/cm/day). These media combination gives best results for better growth performance of *bougainvillea* cuttings than other treatment combination. The results reported from the present investigation are suggestive and need to be studied by using similar media for confirmation of these results.

### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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