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Growth response of geranium aralia (*Polyscias guilfoylei*) to different potting media

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Abstract

An experiment was conducted to evaluate the effect of different potting media on the growth and development of Geranium Aralia (*Polyscias guilfoylei*), an important ornamental foliage plant widely used in landscaping and indoor decoration. The study was carried out under nursery conditions using various combinations of potting media comprising soil, cocopeat, Farmyard Manure (FYM), vermicompost, sand, and other organic amendments. Growth parameters such as plant height, number of leaves, leaf length, leaf width, plant spread were recorded. An experiment entitled "Growth Response of Geranium Aralia (*Polyscias guilfoylei*) to Different Potting Media" ornamental foliage plant. This study aims to discover the optimal media combination for *Polyscias guilfoylei* plant growth. The site of experiment is situated at 23°N latitude and 89°E longitudes at an elevation of 9.75 meters from mean sea level. The experiment comprised seven potting media treatments (media combinations). T1: Soil + sand + FYM (2:1:1), T2: Soil + sand + vermicompost (2:1:1), T3: Soil + sand + FYM + vermicompost (2:1:1.0:0.5), T4: Cocopeat only, T5 Cocopeat + sand + FYM (2:1:1), T6: Cocopeat + sand + vermicompost (2:1:1) and T7: Cocopeat + sand + FYM + vermicompost (2:1:1.0:0.5).

Keywords: *Polyscias guilfoylei*, geranium aralia, potting media, growing media, vegetative growth, ornamental foliage plant

Introduction

Ornamental foliage plants play a vital role in enhancing the aesthetic value of landscapes, gardens, offices, and indoor environments. Their diverse forms, attractive foliage, and adaptability to different growing conditions have contributed significantly to the expanding ornamental horticulture industry. Among the various foliage plants, Geranium Aralia (*Polyscias guilfoylei*), a member of the family Araliaceae, is highly valued for its attractive, deeply lobed, glossy green leaves and compact growth habit. The plant is extensively used as a hedge, border plant, specimen plant, and container-grown ornamental in both tropical and subtropical regions. Owing to its year-round foliage appeal and ease of maintenance, *P. guilfoylei* has gained considerable popularity among landscapers, nursery growers, and home gardeners.

The successful cultivation of ornamental foliage plants largely depends on the quality of the growing medium. Potting media serve as the physical support system for plant roots and provide favourable conditions for water retention, aeration, nutrient availability, and root growth. An ideal potting medium should possess good water-holding capacity, adequate drainage, sufficient porosity, low bulk density, and the ability to supply essential nutrients for sustained plant growth. Traditional soil-based media often suffer from problems such as compaction, poor aeration, and the presence of soil-borne pests and diseases, which can adversely affect plant growth and quality. Therefore, the use of alternative and soilless growing media has become increasingly important in modern nursery production systems. Cocopeat, Farmyard Manure (FYM), vermicompost, and sand are among the most commonly used components in potting media formulations. Cocopeat is recognized for its excellent water-holding capacity, high porosity, low bulk density, and favourable air–water balance, making it an ideal substrate for container-grown plants. Farmyard manure enriches

the medium with organic matter and essential nutrients while improving its physical properties. Vermicompost serves as a rich source of readily available nutrients, beneficial microorganisms, and plant growth-promoting substances that enhance plant growth and development. Sand improves drainage and aeration, thereby facilitating healthy root growth. The combined use of these components can create an optimal growing environment that promotes vigorous vegetative growth and improves the overall quality of ornamental plants.

Although several studies have demonstrated the beneficial effects of different potting media on the growth and quality of ornamental crops, information regarding the response of Geranium Aralia (*Polyscias guilfoylei*) to various media compositions is limited. Identifying an appropriate potting medium is essential for producing healthy, vigorous, and marketable plants under nursery conditions. Therefore, the present investigation was undertaken to evaluate the growth response of Geranium Aralia to different potting media combinations and to determine the most suitable growing medium for its commercial cultivation and nursery production.

Materials and Methods

The present investigation entitled “Growth Response of Geranium Aralia (*Polyscias guilfoylei*) to Different Potting Media” was conducted under a shade-net house at the All India Coordinated Research Project on Floriculture (AICRP on Floriculture), Mohanpur, Bidhan Chandra Krishi Viswavidyalaya (BCKV). The experiment was laid out in a Completely Randomized Design (CRD) comprising seven treatments with three replications. Ten pots were maintained

under each treatment. Healthy and uniform plants of Geranium Aralia were transplanted into pots containing the respective potting media combinations.

Seven different potting media treatments were evaluated, viz., T₁: Soil + sand + FYM (2:1:1); T₂: Soil + sand + vermicompost (2:1:1); T₃: Soil + sand + FYM + vermicompost (2:1:1:0.5); T₄: Cocopeat alone; T₅: Cocopeat + sand + FYM (2:1:1); T₆: Cocopeat + sand + vermicompost (2:1:1); and T₇: Cocopeat + sand + FYM + vermicompost (2:1:1:0.5). The components of each growing medium were thoroughly mixed according to the specified proportions before filling the pots.

All the experimental plants were maintained under uniform environmental and cultural conditions. Irrigation was provided uniformly to all treatments as and when required. Regular intercultural operations, including removal of weeds, dried and damaged leaves, and necessary plant protection measures, were carried out throughout the experimental period to ensure healthy plant growth.

The response of Geranium Aralia to different potting media was evaluated based on various vegetative growth parameters. Observations were recorded at appropriate intervals after transplanting for plant height (cm), number of leaves per plant, leaf length (cm), leaf width (cm), and plant spread (cm). The recorded observations were used to assess the influence of different potting media on the vegetative growth and overall performance of *Polyscias guilfoylei*. The data obtained were subjected to statistical analysis appropriate for a Completely Randomized Design to determine the significance of differences among the treatments.

Table 1: Treatments and composition of different media

S. No.	Treatments	Composition/details
1	T ₁	Soil + sand + FYM (2:1:1)
2	T ₂	Soil + sand + vermicompost (2:1:1)
3	T ₃	Soil + sand + FYM + vermicompost (2:1:1:0.5)
4	T ₄	Cocopeat only
5	T ₅	Cocopeat + sand + FYM (2:1:1)
6	T ₆	Cocopeat + sand + vermicompost (2:1:1)
7	T ₇	Cocopeat + sand + FYM + vermicompost (2:1:1:0.5)

Results and Discussion

Plant height

The data presented in Table 2 revealed considerable variation in plant height of Geranium Aralia (*Polyscias guilfoylei*) under different potting media. The maximum plant height (62 cm) was recorded in T₁ (Soil + sand + FYM, 2:1:1), followed by T₃ (Soil + sand + FYM + vermicompost, 2:1:1:0.5) with a plant height of 51 cm. The lowest plant height (32 cm) was recorded in T₆ (Cocopeat + sand + vermicompost, 2:1:1), followed by T₇ (33 cm) and T₄ (34 cm).

The superior plant height observed in T₁ may be attributed to the combined effect of soil, sand and FYM, which might have provided a favourable root-zone environment with adequate aeration, drainage, moisture retention and nutrient availability. FYM is an important source of organic matter and nutrients, while soil provides mineral nutrients and physical support and sand improves drainage and aeration. The comparatively lower plant height in cocopeat-based treatments may be associated with differences in nutrient

availability and the physical characteristics of the medium when compared with soil-based mixtures.

Number of leaves per plant

Marked differences were observed in the number of leaves produced by plants grown in different potting media. The highest number of leaves (1418 leaves plant⁻¹) was recorded in T₃ (Soil + sand + FYM + vermicompost, 2:1:1:0.5), followed by T₅ (Cocopeat + sand + FYM, 2:1:1) with 812 leaves plant⁻¹ and T₁ (Soil + sand + FYM, 2:1:1) with 391 leaves plant⁻¹. The minimum number of leaves (143 leaves plant⁻¹) was recorded in T₆ (Cocopeat + sand + vermicompost, 2:1:1).

The higher leaf production in T₃ could be attributed to the complementary effects of FYM and vermicompost in the growing medium. The combination of these organic amendments may have improved the nutrient status of the medium and promoted root growth, nutrient uptake and vegetative development. Vermicompost provides readily available nutrients and organic matter, while FYM

contributes to improved soil structure and sustained nutrient release. The combined presence of these components with soil and sand may therefore have created a more favorable environment for continuous leaf initiation and expansion.

Leaf length

Leaf length varied among the different potting media treatments. The maximum leaf length (5.0 cm) was recorded in T₆ (Cocopeat + sand + vermicompost, 2:1:1), followed by T₃ (4.5 cm). T₁ recorded a leaf length of 4.0 cm, while T₂ and T₅ recorded 3.8 and 3.5 cm, respectively. The minimum leaf length (2.5 cm) was observed in both T₄ (Cocopeat alone) and T₇ (Cocopeat + sand + FYM + vermicompost, 2:1:1:0.5).

The greater leaf length in T₆ may be due to the favorable physical properties of cocopeat and the nutrient-supplying capacity of vermicompost. Cocopeat provides good porosity, aeration and moisture retention, which can facilitate healthy root activity, whereas vermicompost may enhance nutrient availability and support leaf expansion. These favorable root-zone conditions could have contributed to improved leaf development.

Leaf width

The highest leaf width (4.5 cm) was recorded in T₂ (Soil + sand + vermicompost, 2:1:1), followed by T₁ (3.7 cm) and T₆ (3.5 cm). The lowest leaf width (2.0 cm) was recorded in T₇ (Cocopeat + sand + FYM + vermicompost, 2:1:1:0.5), followed by T₄ (2.5 cm) and T₅ (2.6 cm).

The greater leaf width observed in T₂ may be associated with the combined influence of soil, sand and vermicompost, which might have provided an appropriate balance between nutrient availability, moisture retention and aeration. Adequate availability of nutrients, particularly nitrogen and other essential elements, is important for the development and expansion of foliage. The relatively narrow leaves under T₇ may indicate that the particular

combination and proportion of substrate components was less favorable for leaf expansion under the prevailing experimental conditions.

Plant spread

Plant spread also showed considerable variation among the potting media treatments. The maximum plant spread in the two measured directions was recorded in T₅ (Cocopeat + sand + FYM, 2:1:1), with 38 × 42 cm, followed by T₃ (31 × 31 cm), T₆ (30 × 21 cm), and T₁ (29 × 28 cm). The minimum plant spread was observed in T₄ (Cocopeat alone), with 19 × 18 cm.

The greater plant spread in T₅ may be attributed to the favorable combination of cocopeat, sand and FYM. Cocopeat may have improved water-holding capacity and aeration, while sand enhanced drainage and FYM supplied organic matter and nutrients. The interaction of these components may have promoted vigorous shoot growth and lateral branching, resulting in greater canopy development. In contrast, the restricted spread observed under cocopeat alone may be due to comparatively lower nutrient availability, as cocopeat primarily functions as a physical growing substrate and may require supplementation with nutrient sources for sustained plant growth.

The variation in growth attributes may be explained by differences in the physical and chemical properties of the respective potting media, including bulk density, porosity, aeration, water-holding capacity, drainage and nutrient availability. Organic amendments such as FYM and vermicompost can improve the nutrient-supplying capacity and biological activity of the growing medium, while cocopeat and sand can modify the air–water relationship within the root zone. Thus, an appropriate combination of growing-media components is essential for achieving balanced vegetative growth and improved plant quality in *Geranium Aralia*.

Table 2: Effect of various combinations of potting media on the plant height, Number of Leaves, Leaf length, Leaf width and Plant spread

S. No.	Treatment name	Plant height (cm)	No. of leaves plant ⁻¹	Leaf length (cm)	Leaf width (cm)	Plant spread (cm)
1.	Soil + sand + FYM (2:1:1)	62	391	4	3.7	29x28
2.	Soil + sand + vermicompost (2:1:1)	46	325	3.8	4.5	22x21
3.	Soil + sand + FYM + vermicompost (2:1:1:0.5)	51	1418	4.5	4	31x31
4.	Cocopeat only	34	195	3	2.5	19x18
5.	Cocopeat + sand + FYM (2:1:1)	42	812	3.5	2.6	38x42
6.	Cocopeat + sand + vermicompost (2:1:1)	32	143	5	3.5	30x21
7.	Cocopeat + sand + FYM + vermicompost (2:1:1:0.5)	33	198	2.5	2	22x24

Conclusion

The present investigation demonstrated that different potting media significantly influenced the vegetative growth and overall performance of *Geranium Aralia* (*Polyscias guilfoylei*). The superior performance of these treatments may be attributed to the beneficial effects of FYM, vermicompost, cocopeat, and sand in improving the physical and chemical properties of the growing medium, such as aeration, porosity, water-holding capacity, drainage, nutrient availability, and root-zone environment. These favorable conditions enhanced nutrient uptake and vegetative growth, resulting in improved plant quality.

Based on the overall growth performance, the treatment T₃ (Soil + Sand + FYM + Vermicompost, 2:1:1:0.5) can be

considered the most suitable potting medium for producing healthy, vigorous, and marketable plants of *Geranium Aralia* under nursery conditions, as it provided a balanced combination of growth attributes and superior foliage development.

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