



Plant Archives

Journal homepage: <http://www.plantarchives.org>

DOI Url : <https://doi.org/10.51470/PLANTARCHIVES.2025.v25.no.2.246>

INFLUENCE OF POTTING MEDIA COMPOSITION ON PLANT GROWTH PARAMETERS OF ALTERNANTHERA IN VERTICAL GARDENING.

M. Chinnari*, T. Suseela, A.V.D. Dorajee Rao, P. Subbaramamma and V. Sekhar

Dr. Y.S.R Horticultural University, COH- Venkataramannagudem, West Godavari District of Andhra Pradesh

*Corresponding author E-mail: manukondachinnari56@gmail.com

(Date of Receiving-27-07-2025; Date of Acceptance-28-09-2025)

ABSTRACT

The present investigation was carried out at College of Horticulture, Venkataramannagudem, West Godavari District of Andhra Pradesh during the year 2024-25. To evaluate the Influence of potting media composition on plant growth parameters of Alternanthera in vertical gardening. The experiment was laid out in FCRD replicated two times. This study will help to workout best potting media ratio for them. We will conclude to highlight a best combination of potting media, among, potting media P₁ [(cocopeat + soil + perlite) (1:2:1)], P₂ [(cocopeat + vermicompost + perlite) (1:2:1)], P₃ [(cocopeat: FYM: perlite) (1:2:1)], P₄ [(cocopeat: biochar: perlite) (1:2:1)] and plant species among Alternanthera variegated, Alternanthera red, Alternanthera pink, Alternanthera gold. Each treatment contained 12 plants. The potting media ratio combination in P₂ [(cocopeat + vermicompost + perlite) (1:2:1)] proved to be the best for improvement of plant growth parameters like plant height, plant spread, number of branches, number of leaves, leaf length, length width, leaf area. Potting media (P₂) capable of providing good amount of all beneficial benefits with more moisture retention capacity, aeration and nutrients value than other combination of potting media used. The least value of all the observations recorded was found to be in potting media P₄ [(cocopeat: biochar: perlite) (1:2:1)].

Key words: Potting media composition, plant growth parameters, Alternanthera, vertical gardening

Introduction

With rapid urbanization, a large population is shifting from rural to urban areas resulting in congested cities and towns leading to a limited horizontal space for greenery and landscaping. Only vertical space is available which can be converted to vertical gardens. Vertical gardens are also referred as green wall, living wall or bio wall (Jain and Janakiram, 2016). Unlike traditional gardening, vertical gardening utilizes vertical space, allowing for increased plant density. The idea of the vertical garden was initiated by Patrick Blanc. Vertical gardens are a promising trend as cities continue to grow vertically, offering a sustainable solution to the challenges of urbanization while revitalizing the very essence of urban landscapes (Premalatha *et al.*, 2024).

Vertical gardens not only increase the amount of green space, but they also serve other purposes including improving air quality, reducing urban heat island effect, isolating sound and heat, producing more energy (Kumar

2023). Indoor vertical gardens are grown on walls. The success of vertical gardening largely depends on the careful selection of plant species, growing media, proper nutrition, and suitable environmental conditions. Among these, the choice of growing media plays a crucial role, as it directly influences plant health and growth. For vertical gardens, the growing media should be light in weight and porous, with appropriate physical and chemical properties. This ensures not only structural stability but also promotes optimal plant growth and development. The ideal media should provide a balance between physical, chemical and biological characteristics to support luxuriant plant growth (Sahin *et al.*, 2002) and Ingram *et al.*, (2003).

Materials and Methods

The present investigation was conducted at College of Horticulture, Dr. Y.S.R Horticultural University, Venkataramannagudem. The location falls under agro-climatic zone-10, humid, East Coast Plains and Hills

(Krishna-Godavari Zone) with an average rainfall of 900 mm at an altitude of 34 m (112 feet) above the mean sea level. The experimental location was geographically situated at 16.83°N latitude and 81.5°E longitude.

Experimental details

Performance of ornamental foliage plants with different potting media in vertical gardening was conducted on 16 treatment combinations and four ornamental plant species (*Alternanthera* variegated, *Alternanthera* red, *Alternanthera* pink, *Alternanthera* gold) with 4 different combinations of potting media P_1 [(cocopeat + soil + perlite) (1:2:1)], P_2 [(cocopeat + vermicompost + perlite) (1:2:1)], P_3 [(cocopeat: FYM: perlite) (1:2:1)], P_4 [(cocopeat: biochar: perlite) (1:2:1)] and stacked on an indoor wall in Factorial completely randomized block design having two replications and 64 frames (192 pots). Irrigation is applied manually, ensuring optimal moisture is maintained throughout the plant's growth period. The nutrient formulation which was used, that is, N: P: K (19:19:19). The different parameters recorded of plants were plant height (cm), plant spread (cm²), number of branches, number of leaves, leaf length (cm), leaf width (cm), Leaf area (cm²).

Treatment details

FACTOR-1: Ornamental foliage plants (F) - 4 levels

F_1 : *Alternanthera* Variegated

F_2 : *Alternanthera* Red

F_3 : *Alternanthera* Pink

F_4 : *Alternanthera* Gold

FACTOR-2: Potting media (P) - 4 levels

P_1 : Cocopeat + Soil + Perlite (1:2:1)

P_2 : Cocopeat + Vermicompost + Perlite (1:2:1)

P_3 : Cocopeat + FYM + Perlite (1:2:1)

P_4 : Cocopeat + Biochar + Perlite (1:2:1)

Observations Recorded

Plant height (cm)

Plant height was measured from 20 DAT to 140 DAT at an interval of 20 days. The height of plant was measured from base to the tip of its longest leaf with help of standard meter scale. Average plant height was calculated and expressed in centimetres.

Plant spread (cm²)

Distance between East-West and North-South directions was measured using a meter scale as plant spread from 20 DAT to 120 DAT at an interval of 20 days. These readings were then averaged, multiplied, and expressed in square centimetres.

Number of branches

The number of branches on four tagged plants was counted at every 20 days interval from 20 DAT to 120 DAT, and averages were calculated in treatments

Number of leaves per plant

The number of leaves on four tagged plants was counted at every 20 days interval from 20 DAT to 120 DAT, and averages were calculated in treatment.

Leaf length (cm)

The length of mature leaf in four tagged plants was measured by using standard meter scale at an interval of the leaf expressed in centimetres. Their mean values were calculated in each treatment combination

Leaf width (cm)

Mature leaf width was measured as the distance between extremes of leaf lamina at widest position. Their averages were worked out expressed as leaf width in each treatment combination.

Leaf area (cm²)

The Leaf area was measured with the help of leaf area meter at 20 days interval by taking average of five fully developed leaves on tagged plants in each treatment from 20 DAT to 120 DAP and expressed in square centimetres

Results and discussions

Plant height(cm)

The data pertaining to plant height at 20, 40, 60, 80, 100 and 120 DAP are presented in Table 1 and Fig. 1. There were significant differences among potting media, foliage plants and treatment combinations with respect to the plant height. The mean plant height was increased from 8.72 cm, 10.22 cm, 12.13 cm, 14.70 cm, 17.46 cm to 19.36 cm at 20, 40, 60, 80, 100 and 120DAP respectively.

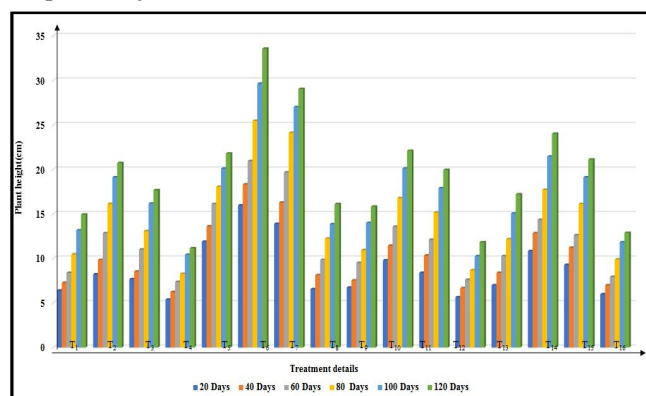


Fig. 1: Interaction of potting media composition on plant height (cm) of *alternanthera* at different intervals in vertical gardening.

Table 1: Influence of potting media composition on plant height (cm) of *Alternanthera* at different intervals in vertical gardening.

Foliage plants (F) (<i>Alternanthera sp.</i>)	Plant height (cm)														
	20 DAP					40 DAP					60 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	6.40	8.22	7.67	5.38	6.92	7.26	9.84	8.53	6.24	7.97	8.39	12.84	11.00	7.37	9.90
F ₂ : A. red	11.88	15.96	13.89	6.55	12.07	13.61	18.32	16.28	8.12	14.08	16.12	20.94	19.67	9.84	16.64
F ₃ : A. pink	6.73	9.79	8.38	5.65	7.64	7.54	11.43	10.33	6.66	8.99	9.51	13.57	12.11	7.61	10.70
F ₄ : A. gold	6.99	10.83	9.28	5.99	8.27	8.38	12.83	11.22	6.99	9.85	10.26	14.34	12.61	7.94	11.28
Mean	8.00	11.20	9.80	5.89	8.72	9.19	13.10	11.59	7.00	10.22	11.07	15.42	13.85	8.19	12.13
Factors	SE (m)		CD at 5%			SE (m)		CD at 5%			SE (m)		CD at 5%		
Foliage plants (F)	0.19		0.56			0.22		0.67			0.18		0.54		
Potting media (P)	0.19		0.56			0.22		0.67			0.18		0.54		
F × P	0.38		1.13			0.45		1.34			0.36		1.09		
Foliage plants (F) (<i>Alternanthera sp.</i>)	80 DAP					100 DAP					120 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	10.46	16.13	13.07	8.27	11.98	13.17	19.12	16.17	10.41	14.72	14.94	20.72	17.68	11.15	16.12
F ₂ : A. red	18.05	25.45	24.11	12.22	19.96	20.10	29.65	27.00	13.86	22.65	21.79	33.56	29.04	16.11	25.12
F ₃ : A. pink	10.94	16.79	15.16	8.68	12.89	13.99	20.11	17.90	10.50	15.62	15.82	22.08	19.95	11.83	17.42
F ₄ : A. gold	12.17	17.72	16.12	9.89	13.97	15.05	21.45	19.12	11.83	16.86	17.21	24.01	21.11	12.88	18.80
Mean	12.91	19.02	17.11	9.76	14.70	15.58	22.58	20.05	11.65	17.46	17.44	25.09	21.94	12.99	19.36
Factors	SE (m)		CD at 5%			SE (m)		CD at 5%			SE (m)		CD at 5%		
Foliage plants (F)	0.21		0.64			0.21		0.62			0.24		0.71		
Potting media (P)	0.21		0.64			0.21		0.62			0.24		0.71		
F × P	0.43		1.29			0.42		1.25			0.47		1.41		
A: Alternanthera; P ₁ : cocopeat: soil: perlite (1:2:1) P ₂ : cocopeat: vermicompost: perlite (1:2:1) P ₃ : cocopeat: FYM: perlite (1:2:1) P ₄ : cocopeat: biochar: perlite (1:2:1).															

Among different foliage plants, highest plant height was observed in (F₂) *Alternanthera* red (12.07 cm, 14.08 cm, 16.64 cm, 19.96 cm, 22.65 cm and 25.12 cm) at 20, 40, 60, 80, 100, 120 DAP followed by (F₄) *Alternanthera* gold (8.27 cm, 9.85 cm, 11.28 cm, 13.97 cm, 16.86 cm and 18.80 cm) at 20, 40, 60, 80, 100 and 120 DAP. The lowest plant height was recorded in (F₁) *Alternanthera* variegated (6.92 cm, 7.97 cm, 9.90 cm, 11.98 cm, 14.72 cm, and 16.12 cm) at 20, 40, 60, 80, 100 and 120 DAP.

Plant height recorded under potting media (P₂) cocopeat: vermicompost: perlite (1:2:1) was maximum (11.20 cm, 13.10 cm, 15.42 cm, 19.02 cm, 22.58 cm and 25.09 cm) at 20, 40, 60, 80, 100 and 120 DAP respectively followed by (P₃) cocopeat: FYM: perlite (1:2:1) (9.80 cm, 11.59 cm, 13.85 cm, 17.11 cm, 20.05 cm and 21.94 cm). The minimum plant height was recorded in (P₄) cocopeat: biochar: perlite (1:2:1) (5.89 cm, 7.00 cm, 8.19 cm, 9.76 cm, 11.65 cm and 12.99 cm) at 20, 40, 60, 80, 100 and 120 DAP.

The interaction effect revealed that combination of F₂P₂ [(*Alternanthera* red) + (cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum plant height (15.96 cm, 18.32 cm, 20.94 cm, 25.45 cm, 29.65 cm and 33.56 cm) followed by F₂P₃ [(*Alternanthera* red) + (cocopeat: FYM: perlite) (1:2:1)] (13.89 cm, 16.28 cm, 19.67 cm, 24.11 cm, 27.00 cm and 29.04 cm) at 20, 40, 60, 80, 100 and 120 DAP respectively while, the minimum plant height

was recorded in F₁P₄ [(*Alternanthera* variegated) + (cocopeat: biochar: perlite) (1:2:1)] (5.38 cm, 6.24 cm, 7.37 cm, 8.27 cm, 10.41 cm, and 11.15 cm) at 20, 40, 60, 80, 100 and 120 DAP.

This might be due to Presence of vermicompost increases availability of nutrients i.e. nitrogen, phosphorous, potassium and several micronutrients of Cu, Fe, Zn and micro-organisms of fungi, bacteria, actinomycetes essential for plant growth (root & shoot) and development. Additionally, cocopeat, perlite added to the potting media. Increases aeration and water-holding capacity, improves nutrient uptake by plants and promoted better plant growth and development. Similar findings reported by Rashidha *et al.*, (2021) in *Aglaonema commutatum* var. 'Silver Frost', Katoch *et al.*, (2024) in *Pedilanthustithymaloides* and Sunil *et al.*, (2024) in *Syngonium*.

Alternanthera red exhibited the maximum plant height. This could be due to its relatively longer internodal length and a more vigorous or upright growth habit. The remaining varieties, such as *Alternanthera* white, pink, and gold, recorded comparatively lower plant heights. These varieties are more suitable for vertical gardening due to their shorter stature, reduced internodal length, and compact, bushy growth habit. The results are in line with Srikanth (2015), Patharikar (2019) suggested that the use of dwarf plant species for vertical garden was

Table 2: Influence of potting media composition on plant spread (cm²) of Alternanthera at different intervals in vertical gardening.

Foliage plants (F) (<i>Alternanthera</i> sp.)	Plant spread (cm ²)														
	20 DAP					40 DAP					60 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	4.89	5.62	5.12	4.56	5.05	5.71	7.48	6.29	5.23	6.18	7.27	9.57	8.22	7.30	8.09
F ₂ : A. red	6.91	9.82	8.75	6.31	7.95	8.51	12.55	11.79	7.83	10.17	11.81	16.82	13.79	9.41	12.96
F ₃ : A. pink	5.24	5.92	5.42	4.72	5.32	6.12	7.90	6.76	5.87	6.66	8.26	10.82	8.96	7.91	8.98
F ₄ : A. gold	5.66	6.73	5.96	5.12	5.87	6.97	8.93	7.92	6.12	7.48	9.55	11.87	10.82	8.53	10.19
Mean	5.67	7.02	6.31	5.18	6.04	6.83	9.21	8.19	6.26	7.62	9.22	12.27	10.45	8.28	10.05
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.02 0.07					0.04 0.11					0.04 0.11				
Potting media (P)	0.02 0.07					0.04 0.11					0.04 0.11				
F × P	0.05 0.14					0.07 0.21					0.08 0.23				
Foliage plants (F) (<i>Alternanthera</i> sp.)	80 DAP					100 DAP					120 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	9.42	11.83	9.37	8.52	9.78	10.52	12.27	11.78	9.40	10.99	11.55	14.93	13.45	10.22	12.54
F ₂ : A. red	13.98	20.95	16.92	11.97	15.95	15.66	23.65	19.59	12.90	17.95	16.95	27.93	23.93	13.93	20.68
F ₃ : A. pink	9.97	12.97	9.96	8.93	10.46	10.91	13.87	11.56	9.92	11.56	11.81	15.38	13.91	10.83	12.98
F ₄ : A. gold	11.95	13.93	12.91	9.98	12.19	12.63	15.99	13.68	10.81	13.28	13.71	17.96	15.79	11.89	14.84
Mean	11.33	14.92	12.29	9.85	12.09	12.43	16.44	14.15	10.75	13.44	13.50	19.05	16.77	11.71	15.26
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.02 0.05					0.05 0.16					0.03 0.09				
Potting media (P)	0.02 0.05					0.05 0.16					0.03 0.09				
F × P	0.03 0.09					0.11 0.32					0.06 0.18				
A: Alternanthera; P ₁ : cocopeat: soil: perlite (1:2:1) P ₂ : cocopeat: vermicompost: perlite (1:2:1) P ₃ : cocopeat: FYM: perlite (1:2:1) P ₄ : cocopeat: biochar: perlite (1:2:1).															

more preferable, use of compact and short plants is one of the most desirable qualities for vertical gardening.

Plant spread (cm²)

The differences in plant spread among various potting media, foliage plants and their interactions at 20, 40, 60, 80, 100 and 120 DAP are represented in Table 2 and Fig. 2. The mean plant spread was increased from 6.04 cm², 7.62 cm², 10.05 cm², 12.09 cm², 13.44 cm² to 15.26 cm² at 20, 40, 60, 80, 100 and 120 DAP respectively.

As regards with foliage plants, the highest plant spread was recorded by (F₂) Alternanthera red (7.95 cm², 10.17 cm², 12.96 cm², 15.95 cm², 17.95 cm² and 20.68 cm²) at 20, 40, 60, 80, 100, 120 DAP followed by (F₄) Alternanthera gold (5.87 cm², 7.48 cm², 10.19 cm², 12.19 cm², 13.28 cm² and 14.84 cm²) at 20, 40, 60, 80, 100 and 120 DAP. The lowest plant spread was recorded in (F₁) Alternanthera variegated (5.05 cm², 6.18 cm², 8.09 cm², 9.78 cm², 10.99 cm², and 12.54 cm²) at 20, 40, 60, 80, 100 and 120 DAP.

Significant differences were recorded among different potting media with respect to plant spread. The plants grown in (P₂) cocopeat: vermicompost: perlite (1:2:1) media had showed the maximum plant spread (7.02 cm², 9.21 cm², 12.27 cm², 14.92 cm², 16.44 cm², and 19.05 cm²) at 20, 40, 60, 80, 100 and 120 DAP followed by (P₃) cocopeat: FYM: perlite (1:2:1) (6.31 cm², 8.19 cm², 10.45

cm², 12.29 cm², 14.15 cm² and 16.77 cm²). Minimum plant spread was recorded in (P₄) cocopeat: biochar: perlite (1:2:1) (5.18 cm², 6.26 cm², 8.28 cm², 9.85 cm², 10.75 cm² and 11.71 cm²) at 20, 40, 60, 80, 100 and 120 DAP.

The interaction effect between the foliage plants and potting media was found significant for plant spread. The treatment combination of F₂P₂ [(Alternanthera red) + (cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum plant spread (9.82 cm², 12.55 cm², 16.82 cm², 20.95 cm², 23.65 cm² and 27.93 cm²) followed by F₂P₃ [(Alternanthera red) + (cocopeat: FYM: perlite) (1:2:1)] (8.75 cm², 11.79 cm², 13.79 cm², 16.92 cm², 19.59 cm² and 23.93 cm²) at 20, 40, 60, 80, 100 and 120 DAP

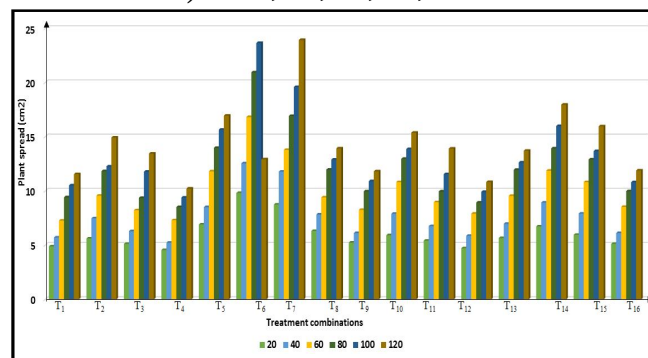


Fig. 2: Interaction of potting media composition on plant spread (cm²) of alternanthera at different intervals in vertical gardening.

Table 3: Influence of potting media composition on number of branches of *Alternanthera* at different intervals in vertical gardening.

Foliage plants (F) (<i>Alternanthera</i> sp.)	Number of branches														
	20 DAP					40 DAP					60 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	3.27	5.77	4.34	2.22	3.90	4.88	7.71	6.54	3.65	5.69	5.93	9.26	8.77	4.87	7.21
F ₂ : A. red	4.83	7.34	6.56	3.94	5.66	6.71	9.71	8.60	5.02	7.51	9.82	12.76	11.83	7.27	10.42
F ₃ : A. pink	7.70	9.81	8.87	5.59	7.99	9.83	12.39	11.11	7.03	10.09	12.66	15.93	14.43	9.72	13.18
F ₄ : A. gold	6.55	8.96	7.55	4.17	6.80	8.60	11.77	10.54	5.93	9.21	11.61	14.82	13.82	7.81	12.01
Mean	5.59	7.97	6.83	3.98	6.08	7.50	10.39	9.20	5.40	8.12	10.00	13.19	12.21	7.42	10.70
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.02 0.07					0.07 0.21					0.08 0.24				
Potting media (P)	0.02 0.07					0.07 0.21					0.08 0.24				
F × P	0.05 0.15					0.14 0.43					0.16 0.48				
Foliage plants (F) (<i>Alternanthera</i> sp.)	80 DAP					100 DAP					120 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	07.00	11.92	10.77	5.72	08.85	10.37	14.60	13.01	7.00	11.24	12.65	16.69	15.32	8.87	13.38
F ₂ : A. red	11.93	15.97	14.40	9.52	12.95	13.25	18.61	16.66	11.17	14.92	15.88	22.82	20.65	12.40	17.94
F ₃ : A. pink	14.83	19.45	16.89	11.25	15.60	16.86	22.25	19.23	13.72	18.01	18.92	25.91	22.35	15.39	20.64
F ₄ : A. gold	13.94	17.77	15.90	9.86	14.36	15.94	19.76	18.75	11.82	16.57	16.39	23.64	22.15	12.80	18.74
Mean	11.92	16.28	14.49	9.09	12.94	14.10	18.80	16.91	10.93	15.18	15.96	22.26	20.12	12.37	17.67
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.07 0.22					0.15 0.45					0.22 0.65				
Potting media (P)	0.07 0.22					0.15 0.45					0.22 0.65				
F × P	0.14 0.43					0.30 0.91					0.43 1.30				
A: Alternanthera; P ₁ : cocopeat: soil: perlite (1:2:1) P ₂ : cocopeat: vermicompost: perlite (1:2:1) P ₃ : cocopeat: FYM: perlite (1:2:1) P ₄ : cocopeat: biochar: perlite (1:2:1).															

respectively while, the minimum plant height was recorded in F₁P₄ [(*Alternanthera* variegated) + (cocopeat: biochar: perlite) (1:2:1)] (4.56 cm², 5.23 cm², 7.30 cm², 8.52 cm², 9.40 cm² and 10.22 cm²) at 20, 40, 60, 80, 100 and 120 DAP.

This might be due to presence of nutrient content like N, P, K, Ca, Mg and plant growth promoting hormones, such as auxins and gibberellins, which contribute to enhanced root development, increased nutrient uptake and overall better plant growth and spread. High nitrogen levels in the media contributed to carbohydrate utilization and enhanced protein synthesis. This intern increased the rate of metabolism, cell division, and cell elongation, promoting apical growth and plant spread. Similar findings were reported by Verma *et al.*, (1996), The unissen *et al.*, (2010), Kameshwari *et al.*, (2014) in chrysanthemum, Kavana *et al.*, (2019) in *Nephrolepisundulate* J. Sm.

Number of branches

A perusal of data (Table 3 and Fig. 3). Revealed that the influence of foliage plants, potting media and their interactions on number of branches was found significant at all growth stages. The mean number of branches was increased from 6.08, 8.12, 10.70, 12.94, 15.18 to 17.67 at 20, 40, 60, 80, 100 and 120DAP respectively.

Among different foliage plants, (F₃) *Alternanthera* pink recorded more number of branches (7.99, 10.09, 13.18, 15.60, 18.01, 20.64) at 20, 40, 60, 80, 100, 120 DAP followed by (F₄) *Alternanthera* gold (6.80, 9.21, 12.01, 14.36, 16.57, 18.74). Less number of branches were recorded in (F₁) *Alternanthera* variegated (3.90, 5.69, 7.21, 8.85, 11.24 13.38) at 20, 40, 60, 80, 100 and 120 DAP.

The observations revealed that(P₂) cocopeat: vermicompost: perlite (1:2:1) media had showed the maximum number of branches (7.97, 10.39, 13.19, 16.28, 18.80 and 22.26) at 20, 40, 60, 80, 100 and 120 DAP

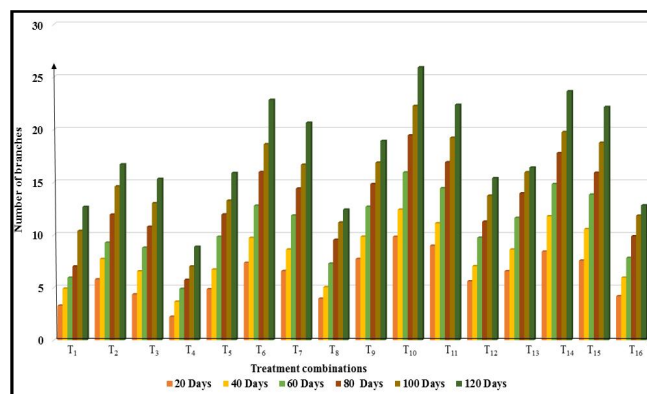


Fig 3: Interaction of potting media composition on number of branches alternanthera at different intervals in vertical gardening.

Table 4: Influence of potting media composition on number of leaves of *Alternanthera* at different intervals in vertical gardening.

Foliage plants (F) (<i>Alternanthera</i> sp.)	Number of leaves														
	20 DAP					40 DAP					60 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	27.11	42.80	35.45	19.69	31.26	32.40	50.30	42.92	26.29	37.98	39.38	59.49	50.27	31.05	45.05
F ₂ : A. red	72.75	105.19	96.33	50.61	81.22	81.75	113.35	104.25	57.29	89.16	91.38	129.30	118.35	65.38	101.10
F ₃ : A. pink	108.77	137.25	128.18	98.27	118.12	119.10	148.60	135.85	105.10	127.16	129.65	163.15	147.00	116.17	138.99
F ₄ : A. gold	86.30	118.27	106.73	57.72	92.25	95.25	127.90	115.20	62.90	100.31	103.25	140.65	125.30	71.44	110.16
Mean	73.73	100.88	91.67	56.57	80.71	82.13	110.04	99.55	62.90	88.65	90.92	123.15	110.23	71.01	98.82
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.44 1.31					0.48 1.44					0.53 1.59				
Potting media (P)	0.44 1.31					0.48 1.44					0.53 1.59				
F × P	0.88 2.63					0.96 2.88					1.06 3.18				
Foliage plants (F) (<i>Alternanthera</i> sp.)	80 DAP					100 DAP					120 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	47.37	68.48	61.37	38.26	53.87	58.48	79.32	71.98	48.89	64.67	65.98	92.40	82.98	54.67	74.01
F ₂ : A. red	104.88	147.33	133.43	73.43	114.76	116.93	161.48	143.92	83.48	126.45	127.43	176.49	156.98	93.43	138.58
F ₃ : A. pink	141.38	183.65	164.55	123.88	153.37	156.44	199.89	179.93	138.99	168.81	170.48	216.44	195.38	144.48	181.69
F ₄ : A. gold	119.33	158.27	142.33	80.88	125.20	132.48	175.93	156.99	92.99	139.60	140.49	190.98	169.98	99.48	150.23
Mean	103.24	139.43	125.42	79.11	111.80	116.08	154.15	138.20	91.09	124.88	126.10	169.08	151.33	98.01	136.12
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.44 1.31					0.60 1.80					0.60 1.79				
Potting media (P)	0.44 1.31					0.60 1.80					0.60 1.79				
F × P	0.87 2.62					1.20 3.61					1.19 3.58				
A: Alternanthera; P ₁ : cocopeat: soil: perlite (1:2:1) P ₂ : cocopeat: vermicompost: perlite (1:2:1) P ₃ : cocopeat: FYM: perlite (1:2:1) P ₄ : cocopeat: biochar: perlite (1:2:1).															

followed by (P₃) cocopeat: FYM: perlite (1:2:1) (6.83, 9.20, 12.21, 14.49, 16.91 and 20.12). Minimum number of branches were recorded in (P₄) cocopeat: biochar: perlite (1:2:1) (3.98, 5.40, 7.42, 9.09, 10.93 and 12.37) at 20, 40, 60, 80, 100 and 120 DAP.

With respect to interactions, the treatment combination of F₃P₂ [(*Alternanthera* pink) + (cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum number of branches (9.81, 12.39, 15.93, 19.45, 22.25, 25.91) at 20, 40, 60, 80, 100 and 120 DAP followed by F₄P₂ [(*Alternanthera* gold) + (cocopeat: vermicompost: perlite) (1:2:1)] (8.96, 11.77, 14.82, 17.77, 19.76, 23.64) at 20, 40, 60, 80, 100 and 120 DAP respectively while, the minimum number of branches were recorded in F₁P₄ [(*Alternanthera* variegated) + (cocopeat: biochar: perlite) (1:2:1)] (2.22, 3.65, 4.87, 5.72, 7.00, 8.87) at 20, 40, 60, 80, 100 and 120 DAP.

The results on the above parameters indicated that the influence of potting media on number of branches this might be due to vermicompost supplies nutrients and plant growth hormones. These phytohormones plays a crucial role in regulating plant growth and development. Auxins stimulate cell elongation and influence apical dominance, cytokinin promote cell division and activate axillary bud outgrowth, while gibberellins enhance stem elongation and expansion. The combined action of these hormones contributes to improved shoot proliferation and

branching. Similar findings were also reported by Kumar *et al.*, (2016), Padhiyar *et al.*, (2017) in chrysanthemum, Kala *et al.*, (2020) in chrysanthemum and Katoch *et al.*, (2024) in *Syngonium podophyllum*.

Number of leaves

The data depicted in Table 4. Significant differences were recorded among different foliage plants, potting media and their interaction. The mean number of leaves was increased from 80.71, 88.65, 98.82, 111.80, 124.88 to 136.12 at 20, 40, 60, 80, 100 and 120DAP respectively.

Significant variations were observed among the different foliage plants with respect to the number leaves. The Maximum number of leaves were recorded in (F₃) *Alternanthera* pink (118.12, 127.16, 138.99, 153.37, 168.81, 181.69) at 20, 40, 60, 80, 100, 120 DAP followed by (F₄) *Alternanthera* gold (92.25, 100.31, 110.16, 125.20, 139.60, 150.23). Minimum number of leaves was recorded in (F₁) *Alternanthera* variegated (31.26, 37.98, 45.05, 53.87, 64.67, 74.01) at 20, 40, 60, 80, 100 and 120 DAP.

Significant differences were recorded among the different potting media with respect to the number of leaves. Potting media (P₂) cocopeat: vermicompost: perlite (1:2:1) recorded the maximum number of leaves (100.88, 110.04, 123.15, 139.43, 154.15, 169.08) at 20, 40, 60, 80, 100 and 120 DAP followed by (P₃) cocopeat: FYM: perlite (1:2:1) (91.67, 99.55, 110.23, 125.42, 138.20,

Table 5: Influence of potting media composition on leaf length (cm) of *Alternanthera* at different intervals in vertical gardening.

Foliage plants (F) (<i>Alternanthera sp.</i>)	Leaf length (cm)														
	20 DAP					40 DAP					60 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	2.40	2.80	2.60	2.30	2.53	2.60	3.15	2.88	2.45	2.77	2.80	3.50	3.15	2.65	3.02
F ₂ : A. red	2.30	2.70	2.50	2.20	2.43	2.50	2.95	2.70	2.40	2.64	2.70	3.22	3.00	2.69	2.90
F ₃ : A. pink	0.90	1.10	1.00	0.70	0.93	1.10	1.30	1.20	0.90	1.13	1.30	1.50	1.35	1.24	1.35
F ₄ : A. gold	2.15	2.55	2.40	1.95	2.26	2.40	2.81	2.70	2.15	2.51	2.60	3.20	2.80	2.35	2.74
Mean	1.94	2.29	2.13	1.79	2.03	2.15	2.55	2.37	1.97	2.26	2.35	2.86	2.58	2.23	2.50
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.01 0.03					0.02 0.05					0.03 0.09				
Potting media (P)	0.01 0.03					0.02 0.05					0.03 0.09				
F × P	0.02 0.06					0.03 0.10					0.06 0.18				
Foliage plants (F) (<i>Alternanthera sp.</i>)	80 DAP					100 DAP					120 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	3.10	3.60	3.40	2.90	3.25	3.30	3.91	3.73	3.10	3.51	3.50	4.30	3.95	3.30	3.76
F ₂ : A. red	2.90	3.51	3.10	2.80	3.08	3.10	3.78	3.30	3.00	3.29	3.35	3.97	3.50	3.20	3.51
F ₃ : A. pink	1.50	1.75	1.60	1.44	1.57	1.70	2.00	1.80	1.64	1.78	2.00	2.30	2.25	1.81	2.09
F ₄ : A. gold	2.70	3.35	3.00	2.55	2.90	3.00	3.55	3.20	2.75	3.13	3.10	3.75	3.40	2.95	3.30
Mean	2.55	3.05	2.78	2.42	2.700	2.78	3.31	3.01	2.62	2.92	2.99	3.58	3.28	2.82	3.16
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.02 0.06					0.02 0.06					0.03 0.08				
Potting media (P)	0.02 0.06					0.02 0.06					0.03 0.08				
F × P	0.04 0.12					0.04 0.12					0.06 0.17				
A: Alternanthera; P ₁ : cocopeat: soil: perlite (1:2:1) P ₂ : cocopeat: vermicompost: perlite (1:2:1) P ₃ : cocopeat: FYM: perlite (1:2:1) P ₄ : cocopeat: biochar: perlite (1:2:1).															

151.33). Minimum number of leaves was recorded in (P₄) cocopeat: biochar: perlite (1:2:1) (56.57, 62.90, 71.01, 79.11, 91.09, 98.01) at 20, 40, 60, 80, 100 and 120 DAP.

The interaction effect revealed that combination of F₃P₂ [(*Alternanthera* pink) + (cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum number of leaves (137.25, 148.60, 163.15, 183.65, 199.89, 216.44) at 20, 40, 60, 80, 100 and 120 DAP followed by F₃P₃ [(*Alternanthera* pink) + (cocopeat: FYM: perlite) (1:2:1) (128.18, 135.85, 147.00, 164.55, 179.93, 195.38) at 20, 40, 60, 80, 100 and 120 DAP respectively while, the minimum number of leaves were recorded F₁P₄ [(*Alternanthera* variegated) + (cocopeat: biochar: perlite) (1:2:1)] (19.69, 26.29, 31.05, 38.26, 48.89, 54.67) at 20, 40, 60, 80, 100 and 120 DAP.

This might be due to vermicompost enhances the nutrient concentration in different plant parts including shoots and roots, which ultimately leads to the development of more number of leaves. Cocopeat provides higher water-holding capacity, cation exchange capacity and greater total pore space. These factors likely facilitated cell multiplication, enlargement, differentiation, which improved photosynthesis and ultimately resulted in a greater number of leaves per plant. Similar findings were also documented by Khayyat *et al.*, (2007) in (*Scindapsus Aureum* L.), Awang *et al.*, (2009) in (*celosia cristata*, Anjana *et al.*, (2017) in *Codiaeum*

variegatum.

Leaf length (cm)

The differences in leaf length among various potting media, foliage plants and their interactions at 20, 40, 60, 80, 100 and 120 DAP are represented in Table 5. There were significant differences among treatment combinations in respect to the leaf length. The mean leaf length was increased from 2.03 cm, 2.26 cm, 2.50 cm, 2.70 cm, 2.92 cm to 3.16 cm at 20, 40, 60, 80, 100 and 120DAP respectively.

As regards with foliage plants, the maximum leaf length was recorded by (F₁) *Alternanthera* variegated (2.53 cm, 2.77 cm, 3.02 cm, 3.25 cm, 3.51 cm, and 3.76 cm) at 20, 40, 60, 80, 100, 120 DAP followed by (F₂) *Alternanthera* red (2.43 cm, 2.64 cm, 2.90 cm, 3.08 cm, 3.29 cm, and 3.51 cm). Minimum leaf length was recorded by (F₃) *Alternanthera* pink (0.93 cm, 1.13 cm, 1.35 cm, 1.57 cm, 1.78 cm, and 2.09 cm) at 20, 40, 60, 80, 100 and 120 DAP.

The plants raised under potting media (P₂) cocopeat: vermicompost: perlite (1:2:1) recorded the maximum leaf length (2.29 cm, 2.55 cm, 2.86 cm, 3.05 cm, 3.31 cm, and 3.58 cm) at 20, 40, 60, 80, 100 and 120 DAP followed by (P₃) cocopeat: FYM: perlite (1:2:1) (2.13 cm, 2.37 cm, 2.58 cm, 2.78 cm, 3.01 cm and 3.28 cm) while the minimum number of leaves was recorded in (P₄) cocopeat: biochar:

Table 6: Influence of potting media composition on leaf width (cm) of *Alternanthera* at different intervals in vertical gardening.

Foliage plants (F) (<i>Alternanthera</i> sp.)	Leaf width (cm)														
	20 DAP					40 DAP					60 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	1.73	2.14	1.93	1.60	1.85	1.93	2.44	2.19	1.82	2.09	2.13	2.62	2.42	1.96	2.28
F ₂ : A. red	1.22	1.64	1.45	1.09	1.35	1.42	1.82	1.63	1.22	1.52	1.64	2.00	1.84	1.44	1.73
F ₃ : A. pink	0.43	0.65	0.53	0.33	0.48	0.64	0.87	0.72	0.52	0.69	0.83	1.00	0.93	0.75	0.88
F ₄ : A. gold	1.08	1.34	1.19	0.91	1.13	1.20	1.52	1.37	1.15	1.31	1.42	1.74	1.64	1.27	1.51
Mean	1.11	1.44	1.27	0.98	1.20	1.30	1.66	1.48	1.18	1.40	1.50	1.84	1.71	1.35	1.60
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.01 0.03					0.01 0.04					0.02 0.05				
Potting media (P)	0.01 0.03					0.01 0.04					0.02 0.05				
F × P	0.02 0.05					0.02 0.07					0.03 0.09				
Foliage plants (F) (<i>Alternanthera</i> sp.)	80 DAP					100 DAP					120 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	2.30	2.90	2.60	2.15	2.49	2.43	3.17	2.92	2.30	2.70	2.64	3.37	3.13	2.58	2.93
F ₂ : A. red	1.83	2.26	2.00	1.64	1.93	2.00	2.44	2.23	1.88	2.14	2.34	2.72	2.49	2.12	2.42
F ₃ : A. pink	1.00	1.20	1.10	0.90	1.05	1.22	1.42	1.33	1.13	1.28	1.49	1.60	1.50	1.38	1.49
F ₄ : A. gold	1.60	2.10	1.80	1.50	1.75	1.81	2.22	2.11	1.76	1.98	2.12	2.59	2.39	1.98	2.27
Mean	1.68	2.12	1.88	1.55	1.57	1.86	2.31	2.15	1.77	2.02	2.15	2.57	2.38	2.01	2.27
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.02 0.06					0.02 0.07					0.02 0.07				
Potting media (P)	0.02 0.06					0.02 0.07					0.02 0.07				
F × P	0.04 0.11					0.05 0.14					0.04 0.13				
A: Alternanthera; P ₁ : cocopeat: soil: perlite (1:2:1) P ₂ : cocopeat: vermicompost: perlite (1:2:1) P ₃ : cocopeat: FYM: perlite (1:2:1) P ₄ : cocopeat: biochar: perlite (1:2:1).															

perlite (1:2:1) (1.79 cm, 1.97 cm, 2.23 cm, 2.42 cm, 2.62 cm, and 2.82 cm) at 20, 40, 60, 80, 100 and 120 DAP.

The treatment combination of F₁P₂ [(*Alternanthera* variegated) + (cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum leaf length (2.80 cm, 3.15 cm, 3.50 cm, 3.60 cm, 3.91 cm, and 4.30 cm) at 20, 40, 60, 80, 100 and 120 DAP followed by F₂P₂ [(*Alternanthera* red) + (cocopeat: vermicompost: perlite) (1:2:1)] (2.70 cm, 2.95 cm, 3.22 cm, 3.51 cm, 3.78 cm, 3.97 cm) at 20, 40, 60, 80, 100 and 120 DAP respectively while, the minimum leaf length was recorded in F₃P₄ [(*Alternanthera* pink) + (cocopeat: biochar: perlite) (1:2:1)] (0.70 cm, 0.90 cm, 1.24 cm, 1.44 cm, 1.64 cm, 1.81 cm) at 20, 40, 60, 80, 100 and 120 DAP.

It is evident from the results that combination of F₁P₂ [(*Alternanthera* variegated) + (cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum leaf length. This might be due to the high organic matter content which increases the water and nutrient holding capacity of the medium and also due to the presence of high N content. Increased nitrogen enhances cell division and elongation in leaf tissues, directly contributing to greater leaf expansion and length. This might be associated with essential nutrients present in coco peat (Organic matter content - 98.0%, N: 0.433%, P: 0.018%, K: 0.783%) and vermicompost (2.5-3.0%), Phosphorous (1.0-1.5%), potassium (1.5-2.0%). This finding is

consistent with the results reported by Swetha *et al.*, (2014) in *Aglaonema*, Chaitra *et al.*, (2024) in *Philodendron xanadu*.

Leaf width (cm)

Significant variations were observed in leaf width at 20, 40, 60, 80, 100 and 120 DAP (Table 6.) by the influence of potting media, foliage plants and their interactions. The mean leaf width was increased from 1.20 cm, 1.40 cm, 1.60 cm, 1.57 cm, 2.02 cm to 2.27 cm at 20, 40, 60, 80, 100 and 120DAP respectively.

Among different foliage plants, maximum leaf width was recorded by *Alternanthera* variegated (F₁) (1.85 cm, 2.09 cm, 2.28 cm, 2.49 cm, 2.70 cm, and 2.93 cm) at 20, 40, 60, 80, 100, 120 DAP followed by (F₂) *Alternanthera* red (1.35 cm, 1.52 cm, 1.73 cm, 1.93 cm, 2.14 cm, and 2.42 cm). Minimum leaf width was recorded by (F₃) *Alternanthera* pink (0.48 cm, 0.69 cm, 0.88 cm, 1.05 cm, 1.28 cm, and 1.49 cm) at 20, 40, 60, 80, 100 and 120 DAP.

It was noticed that the maximum leaf width was recorded in plants raised under potting media (P₂) cocopeat: vermicompost: perlite (1:2:1) (1.44 cm, 1.66 cm, 1.84 cm, 2.12 cm, 2.31 cm, and 2.57 cm) at 20, 40, 60, 80, 100 and 120 DAP followed by (P₃) cocopeat: FYM: perlite (1:2:1) (1.27 cm, 1.48 cm, 1.71 cm, 1.88 cm, 2.15 cm, and 2.38 cm) while the minimum leaf width was

Table 7: Influence of potting media composition on leaf area (cm²) of *Alternanthera* at different intervals in vertical gardening.

Foliage plants (F) (<i>Alternanthera</i> sp.)	Leaf area (cm ²)														
	20 DAP					40 DAP					60 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	2.06	2.53	2.28	1.92	2.20	2.33	2.89	2.50	2.10	2.45	2.60	3.20	2.90	2.40	2.78
F ₂ : A. red	1.64	2.16	1.94	1.45	1.80	1.90	2.40	2.20	1.60	2.03	2.10	2.80	2.50	1.80	2.30
F ₃ : A. pink	0.82	1.15	0.96	0.70	0.91	1.10	1.40	1.20	0.95	1.16	1.30	1.70	1.55	1.05	1.40
F ₄ : A. gold	1.53	1.97	1.75	1.44	1.67	1.75	2.25	2.05	1.65	1.93	2.15	2.50	2.25	1.80	2.18
Mean	1.51	1.95	1.73	1.38	1.64	1.77	2.23	1.99	1.58	1.89	2.04	2.55	2.30	1.76	2.16
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.01 0.03					0.02 0.06					0.01 0.04				
Potting media (P)	0.01 0.03					0.02 0.06					0.01 0.04				
F × P	0.02 0.06					0.04 0.11					0.03 0.07				
Foliage plants (F) (<i>Alternanthera</i> sp.)	80 DAP					100 DAP					120 DAP				
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean	P ₁	P ₂	P ₃	P ₄	Mean
F ₁ : A. variegated	2.95	3.60	3.36	2.70	3.15	3.35	4.00	3.60	3.10	3.51	3.65	4.35	3.85	3.40	3.81
F ₂ : A. red	2.40	3.25	2.90	2.00	2.64	2.80	3.55	3.20	2.30	2.96	3.10	3.75	3.50	2.65	3.25
F ₃ : A. pink	1.50	2.00	1.75	1.35	1.65	1.80	2.30	2.00	1.65	1.94	2.10	2.55	2.30	1.85	2.20
F ₄ : A. gold	2.40	2.90	2.45	2.10	2.46	2.70	3.30	2.90	2.40	2.83	3.00	3.60	3.20	2.60	3.10
Mean	2.31	2.94	2.61	2.04	2.47	2.66	3.29	2.93	2.36	2.81	2.96	3.56	3.21	2.63	3.09
Factors	SE (m) CD at 5%					SE (m) CD at 5%					SE (m) CD at 5%				
Foliage plants (F)	0.01 0.04					0.02 0.06					0.02 0.06				
Potting media (P)	0.01 0.04					0.02 0.06					0.02 0.06				
F × P	0.03 0.08					0.04 0.12					0.04 0.12				
A: Alternanthera; P ₁ : cocopeat: soil: perlite (1:2:1) P ₂ : cocopeat: vermicompost: perlite (1:2:1) P ₃ : cocopeat: FYM: perlite (1:2:1) P ₄ : cocopeat: biochar: perlite (1:2:1).															

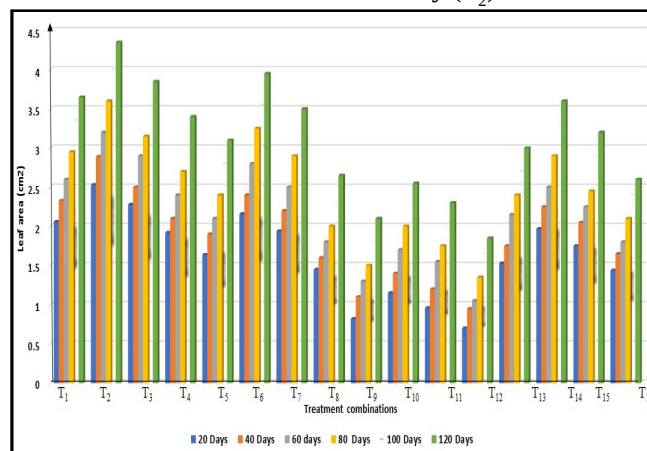
recorded in (P₄) cocopeat: biochar: perlite (1:2:1) (0.98 cm, 1.18 cm, 1.35 cm, 1.55 cm, 1.77 cm, and 2.01 cm) at 20, 40, 60, 80, 100 and 120 DAP.

The interaction effect of F₁P₂[(*Alternanthera* variegated) +(cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum leaf width (2.14 cm, 2.44 cm, 2.62 cm, 2.90 cm, 3.17 cm, and 3.37 cm) at 20, 40, 60, 80, 100 and 120 DAP followed by F₁P₃[(*Alternanthera* variegated) +(cocopeat: FYM: perlite) (1:2:1)] (1.93 cm, 2.19 cm, 2.42 cm, 2.60 cm, 2.92 cm and 3.13 cm) at 20, 40, 60, 80, 100 and 120 DAP respectively while, the minimum leaf width was recorded in F₃P₄[(*Alternanthera* pink) + (cocopeat: biochar: perlite) (1:2:1)] (0.33 cm, 0.52 cm, 0.75 cm, 0.90 cm, 1.13 cm and 1.38 cm) at 20, 40, 60, 80, 100 and 120 DAP. This might be due to vermicompost contains beneficial microorganisms and humic substances that enhance the production of growth-promoting phytohormones such as auxins and cytokinin's while also facilitating the mineralization of organic nitrogen. These biochemical processes stimulate cell division and elongation in leaf tissues, thereby promoting leaf expansion and increasing leaf width, especially when combined with a physically favourable substrate like cocopeat, perlite. The results are in consonance with the findings by Raj *et al.*, (2023) in *Dracaena reflexa*, Chaitra *et al.*, (2024) in *Philodendron Xanadu*.

Leaf area (cm²)

The data pertaining to leaf area at all the growth stages are presented in Table 7 and Fig. 4. There were significant differences among potting media. The mean leaf area was increased from 1.64 cm², 1.89 cm², 2.16 cm², 2.47 cm², 2.81 cm² to 3.09 cm² at 20, 40, 60, 80, 100 and 120DAP respectively.

Among different foliage plants, (F₁) *Alternanthera* variegated recorded maximum leaf area (2.20 cm², 2.45 cm², 2.78 cm², 3.15 cm², 3.51 cm², and 3.81 cm²) at 20, 40, 60, 80, 100, 120 DAP followed by (F₂) *Alternanthera*

**Fig. 4:** Interaction of potting media composition on leaf area (cm²) of *alternanthera* at different intervals in vertical gardening.

red (1.80 cm², 2.03 cm², 2.30 cm², 2.64 cm², 2.96 cm², and 3.25 cm²). Minimum leaf area was recorded in (F₃) *Alternanthera* pink (0.91 cm², 1.16 cm², 1.40 cm², 1.65 cm², 1.94 cm², and 2.20 cm²) at 20, 40, 60, 80, 100 and 120 DAP.

Among different potting media, maximum leaf area was recorded in (P₂) cocopeat: vermicompost: perlite (1:2:1) (1.95 cm², 2.23 cm², 2.55 cm², 2.94 cm², 3.29 cm², and 3.56 cm²) at 20, 40, 60, 80, 100 and 120 DAP followed by (P₃) cocopeat: FYM: perlite (1:2:1) (1.73 cm², 1.99 cm², 2.30 cm², 2.61 cm², 2.93 cm² and 3.21 cm²). While the minimum leaf area was recorded in (P₄) cocopeat: biochar: perlite (1:2:1) (1.38 cm², 1.58 cm², 1.76 cm², 2.04 cm², 2.36 cm², and 2.63 cm²) at 20, 40, 60, 80, 100 and 120 DAP.

With respect to interactions, the treatment combination of F₁P₂[(*Alternanthera* variegated) +(cocopeat: vermicompost: perlite) (1:2:1)] recorded maximum leaf area (2.53 cm², 2.89 cm², 3.20 cm², 3.60 cm², 4.00 cm², and 4.35 cm²) at 20, 40, 60, 80, 100 and 120 DAP followed by F₁P₃[(*Alternanthera* variegated) +(cocopeat: FYM: perlite) (1:2:1)] (2.28 cm², 2.50 cm², 2.90 cm², 3.15 cm², 3.60 cm², and 3.85 cm²) at 20, 40, 60, 80, 100 and 120 DAP respectively while, the minimum leaf area was recorded in F₃P₄[(*Alternanthera* pink) +(cocopeat: biochar: perlite) (1:2:1)] (0.70 cm², 0.95 cm², 1.05 cm², 1.35 cm², 1.65 cm², and 1.85 cm²) at 20, 40, 60, 80, 100 and 120 DAP.

This might be due to potting medium assured better growing environment, supplied sufficient nutrients, besides exhibiting excellent physical, chemical and biological properties. Media provides Macro, micro nutrients and contains humic substances and growth-promoting hormones (IAA, GA, cytokinins) which stimulate cell division and enlargement in leaves. This leads to higher chlorophyll synthesis and improved photosynthetic activity, ultimately expanding the leaf lamina area. Similar findings reported by Katoch *et al.*, (2024) in *Syngonium podophyllum*, Rajan (2020) in *Gerbera* Cv. Goliath.

Conclusion

The present investigation on “Performance of ornamental foliage plants with different potting media in vertical gardening” revealed that potting media containing cocopeat: vermicompost: perlite (1:2:1) recorded significant results for plant growth and visual quality characteristics in *Alternanthera*. Among all the plant growth and visual quality characteristics of different *alternanthera* varieties, the treatment of T₁₄ - P₂F₄ (cocopeat: vermicompost: perlite (1:2:1) +*Alternanthera* gold) was showed significant results.

Acknowledgment

The authors would like to acknowledge Dr. YSRHU, COH, Venkataramannagudem (AP) for providing technical and financial resources for undertaking the investigation.

References

- Anjana, U.F. and Singh D. (2017). Effect of different potting media in different potted croton (*Codiaeum variegatum*) varieties under shade net condition in Allahabad, India. *Int. J. Curr. Microbiol. App. Sci.* **6**(8), 3760-64.
- Awang, Y., Shaharom A.S., Mohamad R.B. and Selamat A. (2009). Chemical and physical characteristics of cocopeat-based media mixtures and their effects on the growth and development of *Celosia cristata*. *American Journal of Agricultural and Biological Sciences.* **4**(1), 63-71.
- Chaitra, K., Sankar M., Sreelatha U., Anupama T.V. and Prameela P. (2024). Optimizing soilless growing media for compact growth of *Philodendron xanadu*. *Journal of Applied Horticulture*, **26**(3), 314-18.
- Ingram, D.L., Henley R.W. and Yeager T.H. (2003). Growth media for container-grown ornamental plants. Environmental Horticulture Department, Florida Cooperative Extension Services, Institute of Food and Agricultural Sciences, University of Florida, BUL 241.
- Jain, R. and Janakiram M. (2016). Vertical gardening: A new concept of modern era. *Commercial Hort.* 527-36.
- Kala, D., Mahawer L.N. and Bairwa H.L. (2020). Response of potting media composition for pot mum chrysanthemum production (*Dendranthema grandiflora* L.). *International Journal of Chemical Studies.* **8**(2), 1246-51.
- Kameswari, P.L., Girwani A. and Padmavathamma A.S. (2014). Effect of different potting media mixtures on growth and flowering of chrysanthemum (*Dendranthema grandiflora* T.) *Progressive Horticulture.* **46**(2), 314-18.
- Katoch, K., Dubey R.K. and Choudhary A. (2024). Evaluation of different combinations of potting media and ornamental plants on growth, biochemical, and nutrient content in outdoor vertical gardening. *Journal of Plant Nutrition.* **47**(19), 3455-68.
- Kavana, G.B., Chandrashekar S.Y., Hanumantharaya L., Sarvajna B. and Hemanth Kumar P. (2019). Effect of potting media on growth parameters of *Nephrolepis undulate* J. Sm under protected condition. *International Journal of Chemical Studies.* **7**(4), 2836-39.
- Khayyat, M., Nazari F. and Salehi H. (2007). Effects of different pot mixtures on pothos (*Epipremnum aureum* Lindl. and Andre ‘Golden Pothos’) growth and development. *American-Eurasian Journal of Agricultural and Environmental Science*, **2**(4), 341-48.
- Kumar, A. (2023). Challenges of Vertical Landscaping in Building Envelope. *International Journal of Landscape Planning and Architecture.* **9**(1), 7-13.

- Kumar, V., Pal M., Singh R.S., Verma R.K. and Verma R.B. (2016). Effect of rooting media on propagation of marigold (*Tagetes erecta* L.) through shoot cutting. *Environment & Ecology*. **34(3)**, 930-32.
- Padhiyar, B.M., Bhatt D.S., Desai K.D., Patel V.H. and Chavda J.R. (2017). Influence of different potting media on growth and flowering of pot chrysanthemum var. Ajina purple. *International Journal of Chemical Studies*. **5(4)**, 1667-69.
- Patharikar, N.A. (2019). Studies on evaluation of ornamental foliage plants for vertical gardening. M.Sc. thesis. MPKV, Rahuri.
- Premalatha, K., Sneha M.A., Preeti Y.H., Sherly J., Kaushik K., Sharma K., Kapoor M. and Maurya N. (2024). The rise of vertical gardens: transforming by urban spaces. *Plant Archives*. **24(2)**, 685-96.
- Raj, A.T., Fatmi U. and Bahadur V. (2023). Performance of Pleomele (*Dracaena reflexa*) Varieties in Different potting MEDIA under Prayagraj Agro-climatic Conditions. *International Journal of Plant & Soil Science*. **35(3)**, 84-89.
- Rajan, E.B. (2020). Studies on the effect of different growing media on the growth and flowering of gerbera cv. Goliath. *Plant Arch*. **20**, 653-57.
- Rashidha, C.K., Sankar M., Sreelatha U., Anupama T.V. and Prameela P. (2021). Standardization of soilless growth media for raising potted ornamental foliage plants for export purpose. *Journal of Tropical Agriculture*. **59(1)**, 118-123.
- Sahin, U., Anapali O. and Ercisli S. (2002). Physico-chemical and physical properties of some substrates used in horticulture. *Gartenbauwissenschaft*. **67**, 55-60.
- Srikanth, D. (2015). Studies on the suitability and performance of certain tropical ornamental plants for exterior green wall M.Sc. thesis 2014-2015.
- Sunil, B., Prashanth P., Zehra Salma, Jyothi G and Praneethkumar (2024). Effect of different media compositions on growth of ornamental foliage plants in vertical gardening. *International Journal of Research in Agronomy*. **7(12)**, 721-26.
- Swetha, S., Padmalatha T., Rao K.D. and Shankar A.S. (2014). Effect of potting media on growth and quality in Aglaonema. *Journal of Horticultural Sciences*, **9(1)**, 90-93.
- Theunissen, J., Ndakidemi P.A. and Laubscher C.P. (2010). Potential of vermicompost produced from plant waste on the growth and nutrient status in vegetable production. *International Journal of the Physical Sciences*. **5(13)**, 1964-73.
- Verma, R.B., Singh P.K. and Singh S.B. (1996). Effect of nitrogen and potassium levels on growth, yield and nutrient uptake of *Colocasia*.