Original Research Article

Influence of different potting media on growth and quality of aglaonema (*Aglaonema commutatum*) var. Red lipstick under Prayagraj agro climatic conditions

ABSTRACT

The present investigation entitled, Influence of different potting media on growth and quality of aglaonema (*Aglaonema commutatum*) var. Red Lipstick under Prayagraj agro climatic conditions was under taken in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj. During kharif season (2022). The experiment was laid out in Completely Randomized Design (CRD) with 12 treatments and each treatment replicated thrice. The potting mixture T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v) reported significantly better performance compared to other potting mixtures, in terms of growth parameters like plant height (36.17 cm), leaf length (17.35 cm), leaf width (6.08 cm), number of leaves (11.50), chlorophyll content (SPAD estimation) (32.87), plant growth index based on plant height (0.148), plant growth index based on number of leaves per plant (0.048), number of suckers/plant (2.67) and survival rate of aglaonema in different potting media (100%).

Key words: *Aglaonema commutatum, growth, media, quality, var. Red Lipstick.*

UNDER PEER REVIEW

Introduction

Ornamental plants have accompanied the history of human civilization, have always been a symbol of expression of well-being and used for improving landscape beauty. Various ethnic groups in Asia, Africa and Latin America continue traditions of using ornamental plants to brighten ceremonies and national day celebrations. As the affluence of a society establishes and grows, so too do ornamental plants increase in popularity. Currently, the most rapidly expanding domestic crops are foliage plants for patio or indoor use, bedding and garden plants.

Aglaonema (Araceae) is one of the most beautiful foliage plants, as are many members of this monocotyledonous flowering plant in which flowers are borne on a type of

inflorescence called a spadix. It has a good combination of leaf color, such as green and red, green and white, pink and green, red, among others. There is generally a crown of wide leaf blades which in wild species are often variegated with silver and green colorations. This plant is used for landscape gardening and potted houseplant because of its beautiful variegated leaves. The darker green varieties can grow in near shade, while the variegated varieties require brighter light. Care of the houseplant involves protecting it from cold temperatures and excessive sunlight and removing any inflorescences that develop, which can prolong the life of the plant. It requires moist soil, and while some cultivars require a small amount of fertilizer, plants are easily injured when over supplemented.

This exotic variety of red aglaonemas has bright red margins and the red mid veins, adding the sophistication and the vibrancy that a room requires. The leaves of the plant are lanceolate shaped and pointy red of green leaf tips.

Growing media has major role to support plants while holding nutrients, water for the plants to use during growth (Gohil *et al.,* 2018). The rooting and vegetative growth of the section was affected by media forms. Growing media should be considered as an essential part of the propagation system, because the rooting capacity depends on the type of medium used. The rooting medium directly affects the quality and the rooting percentage (Farooq, 2018). Good growth media are known to provide a reservoir for plant nutrients, keep plant water available, and provide the plants with a means to exchange gas and good anchorage (Galavi, 2013). The selected components to make the growing mix will have an impact on its physical and chemical properties.

Material and Methods

The field experiment was carried out under the present investigation entitled Influence of different potting media on growth and quality of aglaonema (*Aglaonema commutatum*) var. Red Lipstick under Prayagraj agro climatic conditions, was carried out under 50% shadenet conditions in Horticultural Research Field, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj, Uttar Pradesh, India during 2022-2023. The area comes under sub-tropical zone of Indo-Gangetic plains. Geographically, Prayagraj is situated at 250 24’ 42” N latitude, 810 50’ 56” E longitude and 98 m altitude above the mean sea level

Experimental Details

UNDER PEER REVIEW

The experiment was laid out in Completely Randomized Design with 12 treatments and 3 replications T_0 (soil : sand : FYM 1:1:1 v/v (Control), T_1 (soil : sand : vermicompost 1:1:1 v/v, T_2 (soil : sand : FYM : perlite 1:1:1 :1 v/v), T_3 (soil : sand : vermicompost : perlite 1:1:1:1 v/v), T_4 (soil : sand : FYM : vermicompost 1:1:1:1 v/v), T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v), T_6 (cocopeat : sand : FYM 1:1:1 v/v), T_7 (cocopeat : sand : vermicompost 1:1:1 v/v), T_8 (cocopeat : sand : FYM : perlite 1:1:1 :1 v/v), T_9 (cocopeat : sand : vermicompost : perlite 1:1:1:1 v/v), T_{10} (cocopeat : sand : FYM : vermicompost 1:1:1:1 v/v), T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v). Each component of the mixture was added on the basis of volume while preparing the potting mixture which was added to pots of 8" and the suckers were planted which are brought. The intercultural operations like weeding and irrigation were done as and when necessary. The observations were recorded at different intervals and were statistically analyzed.

Results and discussion

Plant height – Significantly at 150 days after planting the taller plants height recorded in treatment T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 36.17cm) followed by treatment T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 34.67cm) while the shorter plant height recorded in treatment T_0 (soil : sand : FYM 1:1:1 v/v, 30.20cm) compared to all other treatments. The variation in the plant height might be due to the growing media's better water holding capacity, aeration, low bulk density, ideal pH, EC, and high nutritional content as compared to other growing media. Further, the growth and development of this plant was significantly impacted by the physiological, chemical, and growing media qualities. The reports of Singh *et al.* (2002), which provide additional support for the current results.

Leaf length - Significantly the maximum leaf length were recorded in treatment T_5 (soil: sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 17.35 cm), followed by treatment T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 16.56 cm), while the minimum leaf length recorded in treatment T_0 (soil : sand : FYM 1:1:1 v/v, 15.10 cm) compared to all other treatments. The increasing leaf length might be due to the fact that growth substrate having good favourable physicochemical properties and high nutrient content that supported proper plant growth. If any nutrient in the selected growing medium is absent or in less amount then it reduced the plant growth and development. Similar results were also obtained by Chavada *et al.* (2017).

UNDER PEER REVIEW

Leaf width - Significantly the maximum leaf width recorded in treatment T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 6.08cm) followed by T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 5.53cm) while the minimum leaf width recorded in treatment T_0 (soil : sand : FYM 1:1:1 v/v, 5.03cm) compared to all other treatments. Vermicompost's inherent qualities may be primarily attributed for the improved performance in this medium. Vermicompost enhances plant nutrition and contains significant levels of humic chemicals (Sahni *et al.,* 2008).

Number of leaves per plant - Significantly the highest number of leaves per plant recorded in treatment T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 11.50), followed by treatment T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 10.17) while the lowest number of leaves per plant recorded in treatment T_0 (soil : sand : FYM 1:1:1 v/v, 9.00) compared to all other treatments**.** Major food manufacturing units in plants are leaves that are influenced by environmental conditions and soil is one of the factors which have prime importance in this regard. More number of leaves in plants reflects its good vigour and suitability of environment. Similar results were also observed by Mehmood *et al.* (2013).

Chlorophyll content estimated through SPAD - Higher Chlorophyll content was recorded in treatment T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 32.87) when estimated through SAPD meter, followed by treatment T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 30.27) while the lower chlorophyll content recorded in treatment T_0 (soil : sand : FYM 1:1:1 v/v, 24.58) compared all other treatments. Higher protein synthesis owing to soil amendment and increased nitrogen availability for plants as a result of farmyard manure may be the causes of the leaves' more intense colour (Scagel, 2003). Additionally, vermicompost-derived nutrition modifies the biochemical characteristics of plants, such as the production of proteins, enzymes, and chlorophyll (Tomati *et al.,* 1995). In terms of light intensity, Sharma *et al.* (1992) reported a finding that Aglaonema costatum reacted best to low light intensity.

Plant growth index based on plant height - Significantly the maximum plant growth index based on height of the plant recorded in treatment T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 0.148) the growth index on height of the plant was maximum followed by treatment T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 0.136) while, the minimum plant growth index recorded in treatment T_0 (soil : sand : FYM 1:1:1 v/v, 0.100) the growth index was at lowest when compared to all other treatments. Due to the nature of

UNDER PEER REVIEW

perlite of its high porous because of the good soil air circulation, vermicompost and farm manure contributes nutrient content of potting media and high photosynthetic effect of plants (Dubey *et al.,* 2013 and Rajasekar, P and J. Suresh 2015).

Plant growth index Based on number of leaves - Significantly the highest plant growth index based on number of leaves of aglaonema was recorded in treatment T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 0.048) the growth index based on no of leaves per plant was high followed by treatment T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 0.041) while, the lowest plant growth index was recorded in Treatment T_0 (soil : sand : FYM 1:1:1 v/v, 0.032) the growth index was minimum compared to all other treatments. Number of leaves is one of the important growth characters with regard to foliage plants which contribute to the overall beauty of potted plants. Due to the nature of perlite of its high porous because of the good soil air circulation, vermicompost and farm manure contributes nutrient content of potting media and high photosynthetic effect of plants (Dubey *et al.,* 2013 and Rajasekar, P and J. Suresh 2015).

Number of suckers per plant - Highest no. of suckers per plants recorded in treatment T_5 (soil : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 2.63) in which the suckers were observed earlier than all other treatments which is followed by treatment T_{11} (cocopeat : sand : FYM : vermicompost : perlite 1:1:1:1 v/v, 2.00) while, no suckers were recorded in treatment T_0 (soil : sand : FYM 1:1:1 v/v, 0.0),T_6 (cocopeat : sand : FYM 1:1:1 v/v, 0.0). Number of suckers decides the fullness of the entire pot with foliage in addition, because of the physical shape of perlite particles, it provides a suitable balance between moisture retention and aeration. Adding soil and vermicompost into perlite enhanced the growth and productivity of gerbera (Paradiso and Pascale, 2005).

Conclusion

On the basis of the research trail conducted under 50% shade net conditions, it is concluded that Treatment T_5 (Soil: Sand: FYM: Vermicompost: Perlite, 1:1:1:1v/v) treatment combination reported significantly better performance in terms of plant height, leaf length, leaf width, number of leaves per plant, chlorophyll content in leaves, number of suckers/plant, plant growth index based on plant height and number of leaves per plant, survival rate and establishment under 50% shadenet conditions in Prayagraj.

UNDER PEER REVIEW

References

Chavada, J.R., B.V., Thumar, A.N., Vihol, V.S., Patel. and Padhiyar B.M., (2017). Effect of Potting Media on Growth, Flower Yield and Quality of Rose (*Rosa hybrida* L.) cv. Top Secret under Protected Condition. *Indian Journal of Pure & Applied Biosciences*, 5 (5): 821-827.

Dubey, R.K., Singh, S., Kukal, S.S. and Kalsi, H.S. (2013). Evaluation of different organic growing media for growth and flowering of petunia. *communications in soil science and plant analysis,* 44: 1777– 1785.

Farooq, M., Kakar, K., Golly, M.K., Ilyas, N., Zib, B. and Khan, S. (2018). Comparative Effect of Potting Media on Sprouting and Seedling Growth of Grape Cuttings. *International Journal of Environmental and Agriculture Research*, 4(3): 31-39.

Gohil, P., Gohil, M., Rajatiya, J., Halepotara, F., Solanki, M. and Malam, V.R. (2018). Role of growing media for ornamental pot plants. *Indian Journal of Pure & Applied Biosciences*, 6(1): 1219-24.

Galavi, M., Karimian, M.A. and Mousavi, S.R. (2013). Effects of different auxin (IBA) concentrations and planting-beds on rooting grape cuttings (*Vitis vinifera*). *Annual Research & Review in Biology*, 517-523

Mehmood, T., Ahmad, W., Ahmad, K.S., Shafi, W., Shehzad, M.A. and Sarwar, M.A. (2013). Comparative Effect of Different Potting Media on Vegetative and Reproductive Growth of Floral Shower (*Antirrhinum majus* L.). *Universal Journal of Plant Science*, 1(3): 104-111.

Paradiso, R. and De Pascale, S. (2005). Effects of coco fibre addition to perlite on growth and yield of cut Gerbera. In International Symposium on Growing Media 779 (pp. 529534).

Rajasekar, P. and Suresh, J. (2015). Effect of different growing media on growth of pot grown Rose (*Rosa chinensis Jacq*.). *Research in Environment and Life Sciences*, 8(3): 477-478.

Sahni, S., Sarma, B.K., Singh, D.P., Singh, H.B. and Singh, K.P. (2008). Vermicompost enhances performance of plant growth-promoting rhizobacteria in Cicer arietinum

UNDER PEER REVIEW

rhizosphere against Sclerotium rolfsii and quality of strawberry (*Fragaria x ananassa Duch*.). *Crop protection journal,* 27: 369-376.

Scagel, F. (2003). Growth and nutrient use of ericaceous plants grown in media amended with sphagnum moss peat or coir dust. *Horticulture Science*; 38: 46-54.

Sharma, S.P., Jana, B.K. and Bose, T.K. (1992). Investigation on growth and development of house plants. In: *National Seminar on Commercial Floriculture*, pp. 16-17.

Singh, D., Adhikari, D. and Barik, S. (2002). Effect of different growing substrates on aglaonema. *Journal of Botanical Research Institute of Texas,* 12: 241-242.

Tomati, U., Grappelli, A. and Galli, E. (1995). The hormone like effect of earth form casts on plant growth. *Biological fertilisers in Soils;* 5: 288-94.

UNDER PEER REVIEW

Table 1 Influence of different potting media on growth and quality of aglaonema (*Aglaonema commutatum*) var. Red lipstick

Notation	Treatment combinations	Plant Height (cm)	Leaf length (cm)	Leaf width (cm)	Number of leaves per plant	Chlorophyll content
T_0	Soil: Sand: FYM (1:1:1 v/v) (Control)	30.20	15.10	5.03	9.00	24.58
T_1	Soil: Sand: Vermicompost (1:1:1 v/v)	29.47	16.00	5.28	10.00	28.80
T_2	Soil: Sand: FYM: Perlite (1:1:1 :1 v/v)	32.63	15.70	5.37	9.33	25.62
T_3	Soil: Sand: Vermicompost: Perlite (1:1:1:1 v/v)	31.20	15.58	5.05	9.17	24 ss.95
T_4	Soil: Sand: FYM: Vermicompost (1:1:1:1 v/v)	32.23	16.36	5.35	10.00	28.92
T_5	Soil: Sand: FYM: Vermicompost: Perlite (1:1:1:1 v/v)	36.17	17.35	6.08	11.50	32.87
T_6	Cocopeat: Sand: FYM (1:1:1 v/v)	29.67	15.55	5.15	7.83	26.74
T_7	Cocopeat: Sand: Vermicompost (1:1:1 v/v)	30.97	15.82	5.08	9.50	27.78
T_8	Cocopeat: Sand: FYM: Perlite (1:1:1 :1 v/v)	32.07	15.12	5.37	9.17	28.90
T_9	Cocopeat: Sand: Vermicompost: Perlite (1:1:1:1 v/v)	32.08	16.13	4.95	9.67	29.54
T_{10}	Cocopeat: Sand: FYM: Vermicompost (1:1:1:1 v/v)	30.45	16.05	5.00	9.33	27.87
T_{11}	Cocopeat: Sand: FYM: Vermicompost: Perlite (1:1:1:1 v/v)	34.67	16.56	5.53	10.17	30.27
F-TEST		**S**	**S**	**S**	**S**	**S**
SE.d (±)		0.94	0.49	0.22	0.56	1.53
$CD_{0.05}$		1.47	0.77	0.35	0.89	2.40

UNDER PEER REVIEW

CV	3.63	3.81	5.31	7.29	6.70

UNDER PEER REVIEW

Table 2 Influence of different potting media on growth and quality of aglaonema (*Aglaonema commutatum*) var. Red lipstick

Notation	Treatment combinations	PGI based on Plant Height	PGI based on no. of leaves	Number of suckers per plant
T_0	Soil: Sand: FYM (1:1:1 v/v) (Control)	0.100	0.032	0.00
T_1	Soil: Sand: Vermicompost (1:1:1 v/v)	0.109	0.036	1.33
T_2	Soil: Sand: FYM: Perlite (1:1:1 :1 v/v)	0.114	0.035	1.00
T_3	Soil: Sand: Vermicompost: Perlite (1:1:1:1 v/v)	0.112	0.031	1.00
T_4	Soil: Sand: FYM: Vermicompost (1:1:1:1 v/v)	0.116	0.041	0.00
T_5	Soil: Sand: FYM: Vermicompost: Perlite (1:1:1:1 v/v)	0.148	0.048	2.67
T_6	Cocopeat: Sand: FYM (1:1:1 v/v)	0.102	0.033	0.00
T_7	Cocopeat: Sand: Vermicompost (1:1:1 v/v)	0.110	0.034	0.00
T_8	Cocopeat: Sand: FYM: Perlite (1:1:1 :1 v/v)	0.118	0.034	0.00
T_9	Cocopeat: Sand: Vermicompost: Perlite (1:1:1:1 v/v)	0.114	0.038	0.00
T_{10}	Cocopeat: Sand: FYM: Vermicompost (1:1:1:1 v/v)	0.108	0.033	1.00
T_{11}	Cocopeat: Sand: FYM: Vermicompost: Perlite (1:1:1:1 v/v)	0.136	0.041	2.00
F-TEST		**S**	**S**	**S**
SE.d (±)		0.00	0.19	0.19
$CD_{0.05}$		0.01	0.23	0.00

UNDER PEER REVIEW

CV	7.71	11.30	11.03

UNDER PEER REVIEW