Study of Monocot Ornamental Plants Under Prayagraj Agro-Climatic Conditions

ABSTRACT

An experiment was carried out during July 2022 to December 2022 in Shade net, Department of Horticulture,SHUATS,Prayagraj, in Completely Randomized Design (CRD) with different Monocot Ornamental plants replicated three times.This houseplants that are also known to remove harmful chemicals from the air, formaldehyde being its chemical of choice to remove the air. Different plants used in this experment were *Philodendron ceylon,Philodendron wendlandi,Philodendronoxycardium,Thaumatophyllumxanadu ,Philodendronerubescens ,Alo casiareginula,Syngoniumpodophyllum and Monestradelicosa.* It is concluded the present investigation that the Monocot Ornamental plants under study showed significant variation in all the Characters observed.The Variety Philodendron ceylon Reported significantly better performance in sustainable percentage,Sapling height, plant height,leaves length,Canopy radius, root spread and the another Variety *Thaumatophyllum xanadu* Reported significantly better performance in No,of leaves ,leaves length and plant spread Hence the varieties *Philodendron ceylon* & *Thaumatophyllum xanadu* could be recommended for the Prayagraj Agro climatic condition.

Keywords: Ornamental Plants ,CRD, Formaldehyde, Canopy Radius , Root Spread , Sustainable Percentage

INTRODUCTION

Monocot ornamental plants means single cotyledon emerging for the embryo, Ornamental foliage plants are plants that are primarily grown for their beauty. The cultivation of ornamental plants comes under floriculture, which is a major branch of horticulture.

Ornamental foliage plants grown for their attractive leaves rather than flowers and fruits. The use of foliage plants for interior decoration or interior plant scaping has become an integral part of contemporary design, playing an important role in our life (Manaker,2011). Foliage ornamental industry has created as major breakthrough in

floriculture business in recent years. Dependance of potted plants, especially foliage is growing very fast on account of non-availability of ground space in cities.

Ornamental foliage are the most common and easy-to-grow house plants which are popularly used for interiorscaping. They are well adapted to home growing and are maintained at fairly uniform moisture (Trinklein, 1999).

Indoor plants are not only decorative but are surprisingly useful in absorbing potentially harmful gases and cleaning the air inside modern buildings. Since most of the outdoor areas are being reduced due to rapid urbanization, indoor plants must be considered as a boon that will bring a bit nature to indoors.

Foliage plants reduced levels of some interior pollutants, including formaldehyde and carbon monoxide, from small, sealed test chambers (Wolverton et al., 1984; 1985; Zhou, 2011). Further research has shown that plants remove many indoor air pollutants, including ozone, toluene, and benzene (Darlington et al., 2001; Wood et al., 2002; Papinchak et al., 2009). The pollution reduction was largely due to bacteria growing on the plant roots (Wolverton et al., 1989; Wood et al., 2012). The influence of interior plants on dust accumulation has also been explored (Lohr and Pearson-Mims, 1999). Plants were shown to reduce noise under certain conditions as they can reflect, diffract, or absorb sounds, depending on the frequency (Freeman 2014).

Alex (2012) recommended ornamental foliage species for indoors due to compact nature and minimum space required by the plants. Philodendron wendlandii were found to be good to keep under various indoor conditions. Alex (2012) also stated that Philodendron 'Ceylon Gold' lasted for a longer period in medium and high light level zones. The plant spread (east- west) in the air conditioned zone with supplementary light was negatively correlated with light intensity.

In some circumstances, poor indoor air quality may pose serious health risks, particularly in susceptible types. The air pollution tolerance index (APTI) in indoor plants can be used to maintain the quality of indoor air for the occupants of the building APTI indices will help to classify plants from the sensitive group and tolerant ones that can survive even if the door atmosphere is slightly polluted.As ornamental

foliage form a group of beautiful indoor plants, assessing the APTI of different species/varieties will help to identify the types suitable for specific indoor atmosphere. With this background, the present study "Study of Monocot ornamenatl plants under prayagraj agro climatic conditions" was undertaken to evaluate the performance of ornamental foliage plants,to assess their potential under indoor conditions.

2. MATERIALS AND METHODS

A Field experiment entitled “Study of Monocot Ornamental Plants Under Prayagraj Agro-Climatic Conditions” was carried out at the experimental field of the Department of Horticulture, Naini Agriculture Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj to find out the best performing variety for this region.The experiment was laid out in Completely Randomized Design (CRD)with 8 Varities and each Varities was replicated Three times. Eight varieties of Monocot ornamental plants, representing a wide spectrum of morphological variability were selected for the study. The following varieties of Monocot ornamental plants were used for the study *philodendron ceylon, philodendronwendlandi,philodendronoxycardium,philodendron xanadu,philodendron erubescens , Alocasia reginula,Syngonium podophyllum* and *Monestra delicosa.*

Statistical Analysis

Data were subjected to analysis of variance (ANOVA) using OPISTAT Software version 9.3

3. RESULTS AND DISCUSSION

Indicates significant differences regarding the Sapling characters and vegitative characters,sapling characters like sapling height and survival percentage and vegetative characters like plant height,No,of leaves,leaves length,No,of primary branches,plant spread,canopy radius and root spread.

Data in Table 1 Significantly ,The Sapling Height maximum was observed in the variety *Philodendronceylon* (4.5cm) and the minimum was recorded in *Alocasia reginula* (1.1cm) this data was taken after fifteen days of callus formation into sapling in tissue culture laboratory.

The maximum Sapling Sustainability percentage was observed in the variety *Philodendron ceylon* (100%) due to proper surroundings like required amount of light and relative humidity are properly managed in shade net and the minimum Sapling Sustainability percentage was observed in the variety *Alcasia reginula* (33.3%) due to dry weather plants stop growing that leads to death or dormancy of saplings.this data was taken 30 days after potting

Data in Table 2.Plant height is manifested together with the Number of branches and internodal (Eapen, 2003).in the present study also the tallest plants have more internodes length Plant attained maximum height in *Philodendron erubescens* (17.8cm),after 90 days of potting and the minimum was recorded in *Alocasia reginula*(3.1cm) due to warm temperature Apical and intercalary meristems helps to increase the height of *Philodendron erubescens*.the findings of Aasha 1986[1] were also supporting the results.

The number of leaves is an important parameter to consider because it donate health status of plant . The various physiological functions like photosynthesis,transpiration and capability to tolerate air pollution etc depend on numbr of leaves in a plant ,No.of leaves was observed recorded with significnt varitions among different varities the maximum No.of leaves was observed in the *Xanadu* (18.8) While, the minimum No .of leaves was observed in the *Alocasia reginula*(2.7). similar findings was reported with Alex, R.[3]

More the Leaves length in a plant, more will be the physiological activities so it will be the benefits for the plant. It differs from varities to varities and depends on many factors like tiller production and leaf production intervals (Eapen, 2003). In the present study also it differed significantly between the varieties of ornamental foliage the maximum leaves length was observed in the *Philodendron ceylon* (18.1cm) suitable and requires amount of temperature and moisture plays important role in leaves length While, the minimum was observed in the *Alocasia reginula*(2.7cm) in the present study they were measured ninety days intervals and the result are present in table2.similar findings was reported with cerrotta *et al.*[5]

Number of primary branches was recorded with significant variation among different varities , the maximum primary branches was observed in the *Xanadu* (18.8) while the minimum

primary branches was observed in the *Alocasia reginula*(2.7).similar findings was reported with Alex, R.[3]

The plant spread was recorded in two ways viz., North-South and East-West and presented by multiplying the both values in such a way to show the total area covered by a plant the maximum Plant spread was observed in the *Xanadu* (25.5cm) which is found to be at par with *Philodendron ceylon* (24.3cm) While the minimum plant Height was observed in the *Alocasia reginula*(3.2cm) similar results were find in Chen, J *et al.*[9]

The canopy radius was measured from half of the wide of the plant at ninety days after potting, the maximum Canopy radius was observed in the *Philodendron ceylon* (18.76cm) which is found to be at par with *Philodendron erubescens*(14cm),While the minimum Canopy radius was observed in the *Philodendron oxycardium*(2.8cm).similar results were find in croat *et al.*[13]

The Root spread was measured with two times of canopy radius which was recorded at ninety days after potting, loosen and aerate soil promotes a more extensive root system,the maximum Root spread was observed in the *Philodendron ceylon* (37.25cm) which is found to be at par with *Philodendron erubescens*(28cm) While the minimum Root spread was observed in the *Philodendron oxycardium*(5.6cm) similar results were find in Naqvi [17] and alex [3]

Leaf shape,leaf texture,leaf edge, pigmentation,leaf edge and vine were taken as qualitative characters as it helped to identify the aesthetic value of the plants. The plants like *philodendron ceylon, philodendronwendlandi,philodendronoxycardium,philodendron xanadu,philodendron erubescens , Alocasia reginula,Syngonium podophyllum* and *Monestra delicosa.*The data on estimated Qualitative leafe characters of the varities were recorded and significant differences were observed at ninety days after potting shown in Table 3.

TABLE 1. SAPLING HEIGHT AND SAPLING SUSTAINABILITY PERCENTAGE OF DIFFERENT MONOCOT ORNAMENATL PLANTS FOR 15 DAYS.

Treatment	Varities	Sapling height	Sapling sustainability percentage
V1	*Philodendron ceylon*	4.5	100
V2	*Philodendron wendlandi*	2.1	66.6
V3	*Philodendron oxycardium*	2.0	88.8
V4	*Alocasia reginula*	1.1	33.3
V5	*Syngonium podophyllum*	2.1	88.8
V6	*Thaumatophyllum xanadu*	3.4	88.8
V7	*Monatera delicosa*	2.0	66.6
V8	*Philodendron erubescens*	4.5	77.7
Mean		4.812	1308.81
F-Test		S	S
SE(M)		0.061	0.589
CD at 5%		0.185	1.781
CV		3.910	1.338

TABLE 2. PLANT HEIGT,N0.OF LEAVES,LEAVES LENGTH,NO.OF PRIMARY BRANCHES,PLANT SPEAD,CAANOPY RADIUS,ROOT SPREAD OF DIFFERENT MONOCOT ORNAMENATL PLANTS FOR 90 DAYS.

Varities	**Plant height**	**No. of leaves**	**Leaves length**	**No. of primary branches**	**Plant Spread**	**Canopy Radius**	**Root Spread**
Philodendron ceylon	22.9	11.5	18.1	11.5	24.3	18.76	37.52
Philodendron wendlandi	8.2	5.6	6.8	5.6	9.9	4.8	9.6
Philodendron oxycardium	12.6	5.5	9.8	5.5	8.8	2.8	5.6
Alocasia reginula	3.1	2.7	6.5	2.7	3.2	3	6
Syngonium podophyllum	13.8	6.3	7.4	6.3	17.6	4.8	9.6
Thaumatophyllum xanadu	8.4	18.8	5.5	18.8	25.5	14	28
Monatera delicosa	15.6	4.3	8.6	4.3	5.9	4.3	8.6
Philodendron erubescens	18.5	0.11	12	10.1	15.7	14	28
Mean	12.8	8.10	9.3	8.1	13.8	8.3	16.6
F-Test	S	S	S	S	S	S	S
SE(M)	0.12	0.4	0.1	0.4	0.2	0.1	0.2
CD at 5%	22.9	1.2	0.3	1.2	0.7	0.2	0.6
CV	8.2	8.7	2.1	8.7	3.1	1.7	2.1

TABLE 3. LEAF SHAPE,LEAF TEXTURE,LEAF EDGE,LEAF PIGMENTATION,LEAG EDGE,VINEOF DIFFERENT MONOCOT ORNAMENATL PLANTS FOR 90 DAYS.

VARITIES	LEAF SHAPE	LEAF TEXTURE	LEAF EDGE	PIGMENTATION	LEAF EDGE	VINE
Philodendron ceylon	Oval	Smooth	Entire	Yellow glossy, gradually yellowish green	Pinnate	No Vine
Philodendron wendlandi	Broadly lance-shaped	Smooth	Entire	Green and purple below in juvenile later turns green	Pinnate	No Vine
Philodendron oxycardium	Heart shaped	Smooth	Entire	Bright kelly green	Pinnate	Vine
Alocasia reginula	Arrow shaped	Pluffy	Entire	Deep shiny blackish green	Pinnate	No Vine
Syngonium podophyllum	Juvenile -Ovate, heart shaped Adult-Arrow shaped leaves	Smooth	Lobed	Glossy pink in juvenile later turns in to pinkish green	Pinnate	No Vine
Thaumatophyllum xanadu	Deeply divided, drooping shape	Smooth	Lobed	Dark sacramen to green	Pinnate	No Vine
Monatera delicosa	Heart shape	Rough	Parted	Deep green	Pinnate	Vine

Philodendron erubescens	Heart shape	Smooth	Entire	Variegated,pink and green	Pinnate	Vine

4. CONCLUSION:

It is concluded the present investigation that the Monocot Ornamental plants under study showed significant variation in all the Characters observed. The Variety Philodendron ceylon Reported significantly better performance in sustainable percentage, Sapling height, plant height, leaves length ,Canopy radius ,Root spread and the another Variety Thaumatophyllum xanadu Reported significantly better performance in No, of leaves ,leaves length and plant spread Hence the varieties Philodendron Ceylon & Thaumatophyllum xanadu could be Recommended for the Prayagraj agro climatic condition.

5. REFERENCES:

1. **Aasha, K. (1986).** Effect of varying light intensities on the growth and development of indoor olinge and flowering plants. M.Sc.(Hort) thesis, Kerala Agricultural University,Trivandrum. 101p.
2. **Aberg, B.(1958).** Ascorbic acid, Hdb Pilz Physiol, 6:479-499.
3. **Alex, R.(2012).** Evaluation of Foliage plants for Interior plantscaping. Ph.D. (Hort) thesis, Kerala Agricultural University, Thrissur. 140p.
4. **Bell, J.N.B. and Mudd, CH. (1976).** Sulphur dioxide resistance in plants: a case study of Lolium perenne. In: Mansfield, T.A (ed.) Effects of air pollutants on plants Cambridge, Cambridge Univ. Press. pp.87-10
5. **Benedetto, A.D., Molinari, J., Boschi, C., Benedicto, D., Cerrotta, M. and Cerrotta, G. (2006).** Estimating crop productivity for five ornamental foliage plants. Int. J. Agri. Res. 1(6):522-533.
6. **Broschal, T.K. and Donselman, H. (1987),** Potential of 57 species of tropical ornamental plants for cut foliage use. HortSet, 22: 911-913
7. **Bhattacharjee, S.K. (1997**). Packaging fresh cut flowers. Indian Hort. 42:23-27.
8. **Bionda, R.J. and Noland, D.A. (2006).** Floriculture from greenhouse production to floral design (Indian Reprint). Int. Book. Distributing Co., Lucknow. 662p
9. **Chen, J., Henny, R.J. and, McConnell, D.B.(2002).** Development of new foliage

plant cultivars. In: Janick, J. and Whipkey, A. (eds). Trends in new crops and new user 572p. Chen, J., Henny, RJ., McConnell, D.B. and Nell, T.A. 2001. Cultivar differences in interior performances of acclimatized foliage plants. Acta Hort. 543:135-140. Chen, J., Wang, Q., Henny, R.J. and McConnell, D.B. 2005. Response of tropical foliage plants to interior low light conditions. Acta Hart. 669-51-56.

10. **Conover, C.A. and Poole, RT. (1984).** Acclimatization of indoor foliage plants. Hort. Rev. 6:119-154.
11. **Darlington, A.B., Dat, J.F. and Dixon, M.A. (2001)**. The biofiltration of indoor air: Air flux and temperature influences the removal of toluene, ethylbenzene, and xylene. Environ. Sci. Tech. 35:240-246
12. **Davison, E. (1998)**. Interior plants: Selection and Care [on-line]. Available: http://www.cmg.colostate.edu [23 July 2011).
13. **Croat, Thomas B. (1997).** "A Revision of Philodendron Subgenus Philodendron (Araceae) for Mexico and Central America". Annals of the Missouri .
14. **Lohr, V.1. (2010).** What are the benefits of plants indoors and why do we respond positively to them? Acta Hort. 881:675-682.
15. **Lakshmi, P.S., Sravanti, K.L. and Srinivas, N. (2008)**. Air pollution tolerance index of various plant species growing in industrial areas. The Ecoscan. 2(2):203-206
16. **Liu, Y. and Ding, H. (2008)**. Variation in air pollution tolerance index of plants near a steel factory: Implications for landscape-plant species selection for industrial areas. WSEAS transactions on Environ. Devt. 4(1):24-32.
17. **Naqvi, M.B. (1999).** Cut foliage. Floriculture Today 3:24-29.
18. **Randhawa, G.S., and Mukhopadhyay, A. (1986).** Floriculture in India. Allied Publishers Pvt. Ltd, St.Peterburg, 265p.
19. **Russ, K. and Pertuit, A. (2001)**. Foliage plants [on-line]. Available on: http://hgic.clemson.edu/factsheets/HGIC1504 [04 June 2010].
20. **Wood, R.A., Orwell, RL, Tarran, J., Torpy, F. and Burchett, M. (2002).** Potted-plant/ growth media interactions and capacities for removal of volatiles from indoor air. J. Hort. Sci. Biotech 77:120-129