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EFFECT OF DIFFERENT GROWING MEDIA ON THE ROOTING OF *FICUS BINNENDIJKII* 'AMSTEL QUEEN' CUTTINGS

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ABSTRACT

Ficus binnendijkii 'Amstel Queen' is a very attractive plant and a new addition to the landscape industry of the area. To optimize the propagation technology for this important plant, a study was conducted to see the effect of rooting media on the root initiation and development in two different types of cuttings (hardwood and softwood). Five different rooting media were used including silt, sawdust, rice husk, leaf mold and control (soil + silt + FYM at 1:1:1 ratio). It was surprising that the hardwood cuttings did not produce roots in any media. The data recorded on the softwood cuttings revealed that the quickest sprouting (16.7 days) occurred in cuttings that were planted in sawdust. The cuttings grown in leaf mold produced maximum leaves (7.0), which were the longest (20cm leaf length) with maximum leaf area (84.7cm^2) and maximum roots (15). However, the leaf mold produced minimum root length (12.7cm) and weight (1.7g) and took comparatively longer time (22 days) to sprout. Plants grown in silt produced longest (23.7cm) roots and maximum root weight (5.3g) but they also resulted in minimum leaf number (3.3) and shortest leaves (13cm).

Keywords: *Ficus binnendijkii* 'Amstel Queen', media, rooting, softwood, cuttings, propagation, material.

INTRODUCTION

Ficus binnendijkii 'Amstel Queen' is a very nice-looking plant used in various landscape projects. It is commonly known as Ficus Amstel Queen and belongs to family Moraceae. It is a new addition to the ornamental horticulture industry which has gained quick popularity, particularly as a landscape plant. It is an evergreen plant, height up to 7 meters having long narrow dark green leaves carried densely on a high canopy. The tightly packed leaves are a special feature. The plant is renowned for its toughness growing in the worst of situations and still looking good. It enjoys good watering, a little fertilizing and ample sunshine. Being a versatile plant, it can be best grown as a container plant, indoor potted plant, topiary and a specimen in a verity of landscapes at various locations.

In nursery production industry, a variety of growing media are in use worldwide, especially in the ornamental plant production. Growers and nurserymen in Pakistan, specifically NWFP, are not familiar with the propagation of Ficus Amstel Queen. To solve this problem, the current experiment was designed in which different planting media were used because planting medium is considered to be an important and necessary for the growth and development of a plant. It provides the basic necessities required by the plant throughout its life. In general, seedling and cuttings are grown in various types of soils due to which the root environment is significantly affected by the physical and chemical properties of the media used. According to Larson (1980) the best planting media must have a pH conducive to plant growth, a structure that will permit gaseous exchange to provide aeration for the root and permit water infiltration and movement.

According to Kambooh (1984), organic matter content of the planting medium has a profound effect on its biological, chemical and physical properties. Through the decomposition of organic matter chemical elements become available to the plants. Organic matter provides food and energy to the micro organism and they help build good soil structure. All organic matter, except for a small fraction, comes from plants. About 90% of it by weight is made up of carbon, Hydrogen and oxygen. The remaining 10% is sulphur, phosphorus, nitrogen, potassium, calcium, magnesium and a minute amount of microelements. This is the material that helps improve soil structure, impart the dark colour to the soil, and increase the soil water holding capacity.

To optimize the technology for the propagation of this plant the present experiment was designed with the objective to determine the proper type of cutting and efficient medium for the propagation and nursery production of Ficus Amstel Queen.

MATERIALS AND METHODS

To study the effect of different growing media on the rooting of *Ficus binnendijkii* 'Amstel Queen' cuttings, a research study was carried out at Ornamental Horticulture Nursery Farm, Department of Horticulture, N-W.F.P. Agricultural University Peshawar during the year 2003.

The experiment was laid out in randomized complete block design (RCBD) with three replications and two factors i.e. two cutting types (hardwood and softwood cuttings) and five different growing media i.e. silt, sawdust, rice husk, leaf mold and control (soil + silt + FYM at 1:1:1 ratio). Five cuttings per treatment were inserted in black polythene bags filled with the required media and in this way a total of 150 cuttings were sued for the five different media. The cuttings were planted on July 15, 2003 and irrigated with a sprinkler. The cuttings were then covered with a clear polythene sheet to maintain high humidity and prevent water loss from the cuttings through transpiration.

Irrigation of the plants was repeated when it was needed. The experiment lasted until November 15, 2003 and the data were recorded on days to sprouting, leaf number, leaf length, lamina area, root number, root length and root weight. For root measurements, the soil was removed from the rooted cuttings, their roots washed and separated from the cuttings before subjecting to the root number, length and weight measurements. The data were subjected to analysis of variance (ANOVA) and least significant difference (LSD) test (where needed) using a computer software MSTATC (Michigan State University, USA).

RESULTS AND DISCUSSION

It is important to mention that none of the hardwood cuttings rooted in any of the media tested and all of them failed to survive. However, the softwood cuttings rooted successfully and the data recorded on them was analysed as one factor RCBD, and the results are presented here.

Data recorded for days to sprouting are presented in Table-1. The analysis of variance (ANOVA) showed that planting media had a significant effect on days to sprouting. Mean values for days to sprouting showed that Sawdust proved to be the earliest sprouting medium with 16.7 days closely followed by silt with 21 days, while late sprouting occurred in leaf mold taking 24 days. The main reason involved in the efficient performance of sawdust is the internal high temperature of the medium which causes quick sprouting.

Data pertaining to number of leaves are displayed in Table-1. The analyses of variance indicate that different planting media have significant effect on number of leaves per plant. Means for number of leaves per plant indicates that maximum numbers of leaves per plant (7.0) were calculated in leaf mold followed by (4.3) in control while minimum numbers of leaves per plant (3.3) were obtained in silt. The reason for the best performance of leaf mold is high organic matter content which increases the water and nutrient holding capacity of the medium also high N content i.e. 4813 ppm which play vital role in the vegetative growth of the plant. It has also high K content i.e. 764 ppm, which improve the water utilization capacity of plant. Joiner and Nell (1982) find similar results in peat + perlite mixture for Aglaonema and Dieffenbachia.

The data noted for length of leaves per plant are given in Table-1. The analysis of variance showed that the length of leaves per plant was significantly affected by treatments. The means in Table-1 indicate that maximum leaf length (20cm) was calculated in leaf mold followed by (15.7cm) in rice husk and control while minimum leaf length (13cm) was calculated in silt. The reason for the best performance of leaf mold is the high organic matter, N and P content. The plants in this medium also have maximum number of roots, which indicate high absorption rate of available nutrients, which in turn results in larger leaves. Verdock Boodt (1981) found the similar results in pine leaf mold for azaleas and rhododendrons in his experiment.

The data recorded for lamina area per plant in different media is given in Table-1. The statistical analysis of the data indicates that different soil media have significant effect on the lamina area per plant. Means in Table-1 shows that maximum lamina area (84.6cm^2) was found in leaf mold followed by saw dust while minimum lamina area (38.3cm^2) was observed in control. The main reason for greater lamina area in leaf mold is the larger and maximum number of leaves. Poole and Conover (1991) find similar results in Florida peat for Aglaonema.

The data related to number of roots per plant is given in Table-1. The analysis of variance showed that medias have significant effect on number of roots per plant. Means shows that maximum number of roots (15.0) was measured in leaf mold followed by (13.3) in silt while minimum number of roots (8.3) were observed in rice husk. The only reason for the maximum numbers of roots was the availability of essential nutrient at surface of the medium so for effective absorption the plants will have to produce more roots. The results were similar to that of Merrow (1995) he found similar results in sedge peat medium for *Ravenea rivularis* (Majesty plant).

Table-1. Effect of different media on the rooting and performance of *Ficus binnendijkii* 'Amstel Queen'.

Media	Days to sprouting	Number of leaves	Leaf length	Leaf area	Number of roots	Root length	Root weight
Silt	21.0 ab	3.3 b	13.0 b	58.7 b	13.3 ab	23.7 a	5.3 a
Sawdust	16.7 b	4.0 b	15.0 b	60.0 b	11.0 bc	18.7 b	3.0 b
Rice husk	21.7 a	4.0 b	15.7 b	49.0 bc	8.3 c	20.7 b	2.3 b
Leaf mold	22.0 a	7.0 a	20.0 a	84.7 a	15.0 a	12.7 c	1.7 b
control	24.0 a	4.3 b	15.7 b	38.3 c	11.7 abc	18.7 b	2.3 b
Significance	*	*	*	*	*	*	*
LSD	**4.7**	**1.8**	**2.9**	**14.1**	**3.8**	**2.9**	**1.5**

Values followed by different letters are significantly different at $P \leq 0.05$ level according to least significance difference (LSD) test.

The data related to root length is presented in Table-1. The analysis showed that media have significant effect on the length of root per plant. The means of roots length show that maximum roots length (23.7cm) was measured in silt followed by (20.7cm) in rice husk while minimum root length (12.7cm) was recorded in leaf mold. Main reason for the best performance of silt is the downward moment of water and nutrients because the roots had to absorb the water and nutrients there for they increased their length. Lal and Dana (1985) find the similar results in sand for Carnation.

The data related to root weight is given in Table-1. The statistical analysis of the data showed that different soil media have significant effect on the roots weight per plant. The means of root weight per plant shows that maximum root weight (5.3g) was obtained in silt followed by (3.0g) in sawdust while minimum root weight (1.7g) was observed in leaf mold. The main reason for the best performance was the number of roots and root length. Lokesha et al (1988) found similar results in sand for Bougainvillea.

CONCLUSION

On the basis of results obtained from this study, it is concluded that propagation of Ficus Amstel Queen through hardwood cuttings is not easy without the use of rooting hormones. Softwood cuttings, however, showed good response to silt in root development while leaf mold was efficient in producing more leaves, leaf area, plant height and other Arial parameters.

It is recommended that Ficus Amstel Queen should be propagated through softwood cuttings. Silt and leaf mold are the best growing media for root formation and growth of Ficus Amstel Queen, though silt is more economical.

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