

Determination of a suitable growing medium and a commercial fertilizer for *Echinodorus parviflorus* ‘Tropica’ in the nursery level

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Introduction

Aquatic Plant varieties have unique morphology and habitats as commercially important aquatic plants. (Dissanayake, 2007). The most popular ornamental aquarium plants genera are *Anubias*, *Cryptocoryne*, *Echinodorus*, *Aponogeton*, *Hygrophyla*, *Bacopa*, *Hydrilla*, *Cabomba*, *Myriophyllum*, *Lagenandra*, *Vallisneria* and *Elodea*. Among these plant genera *Cryptocoryne*, *Lagenandra*, *Aponogeton* and *Echinodorus* have important characteristics as aquarium plants in Sri Lanka. *Echinodorus* species have attractive green to mid green submerged leaves arranged in a rosette with beautiful, white flowers occurring in an inflorescence (Muhlberg, 1982). Aquatic plants play a significant role in the freshwater ecosystems worldwide. With time ecosystem may collapse without aquatic plants due to wild collection. Therefore growing plants is solution for that. An aquatic plant growing medium was essential for that. The growing mediums contain sand, silt and clay proportion according to the ratio of the medium. Four different ratios were used as treatments (T). T1- Boggy soil: Bricks particles T2- 3:1, Boggy soil 3: Sand 1, T3-Boggy soil: Top soil -3:1, T4-Top soil were treatments. Growing medium should balance the aeration and water for maximum root growth and physically support for the plant. Practical size of the growing medium should be with adequate pore spaces between the particles (Bilderback, 2005)

Nutrition is a major factor for the plant growth. Therefore nutrient should be supplied in optimum level at the correct time as fertilizers.

Methodology

The present study was carried out to investigate the effect of growing medium and fertilizer for the growth of *Echinodorus parviflorus* ‘Tropica’ National Aquaculture Development Authority (NAQDA) Ornamental Fish Breeding and Training center in Rambadagalle Sri Lanka. Experiment one was conducted to find out a suitable nursery medium for the *E.parviflorus* ‘Tropica’ plant. Boggy soil, brick particles, sand and top soil were used. Using those growing substrate four types of media used as treatments (T), T1- Boggy soil: Bricks particles T2- 3:1, Boggy soil 3: Sand 1, T3-Boggy soil: Top soil -3:1, T4-Top soil were treatments. Experiment two four fertilizer mixture used as four treatment of fertilizer, T1-N: P: K -4:2:1, T2- N: P: K -5:2:3, T3- N: P: K -3:1:1 and T4- N: P: K -20:20:20 were used during this study.

Uniform *Echinodorus parviflorus* ‘Tropica’ about 4.5 cm -6.5 cm heights, same age plants were selected for the experiment. Old and rotted leaves were removed; leaving 5- 6 laves to remain. Old and rotted roots also were trimmed, leaving the only healthy roots. Initial weights between 0.5 g - 1.5 g of plants were selected. Experiment one and two results were analyzed by using Minitab 16 computer package and significant differences between treatments were identified using Analysis Of

Variance (ANOVA) produce at 5% probability level. In experiment one T4-Top soil and experiment two T4- N: P: K -20:20:20 were used as control of the both experiments.

Results

According to experiment one, Boggy soil 3: sand 1(T2) growing medium was most suitable growing medium among other used media for the *E.parviflorus* ‘Tropica’. In the experiment one, there was significant difference ($P < 0.05$) among four treatments regarding increment of plant height, weight, dry weight and root length. As indicated Table1, the maximum growth was observed in T2.

Table 1. Influence of growing medium on Tropica plant growth

Substrate	Plant height difference (cm)	Plant weight difference (g)	Dry weight difference (g)	Root length difference (cm)
T1	4.2500	1.5503	0.0265	1.5633
T2	4.7767	1.623	0.0211	4
T3	3.6833	1.6993	0.02167	1.6667
T4	2.8367	0.6407	0.02517	1.5833

According to experiment two N: P: K -4:2:1(T1) fertilizer ratio was the suitable fertilizer ratio for *Echinodorus parviflorus* ‘Tropica’ plants. In the experiment two there was significant difference ($P < 0.05$) among four treatment regarding increment of plant height, weight, dry weight and root length. As indicated Table 2, the highest growing was observed in T1.

Table 2. Influence of fertilizer Tropica plant growth

Fertilizer	Plant height difference (cm)	Plant weight difference (g)	Dry weight difference (g)	Root length difference (cm)
T1	6.3693	2.2598	0.05697	4.6897
T2	4.0967	1.7111	0.05184	1.9496
T3	4.0332	1.5896	0.03873	1.8693
T4	3.9166	1.3958	0.02767	1.5703

Discussion

Based on the results obtained from the present study, it can be concluded that the parameters which measured the growth of the *Echinodorus paviflorus* variety Tropica. Considering the analyses carried out separately with four parameters, both experiments one and experiment two were able to found out a suitable growing medium and a suitable fertilizer mixture for enhancing the growth of *Echinodorus parviflorus* 'Tropica'.

Conclusions

Most suitable fertilizer ratio for growth of plant is N: P: K- 4: 2: 1 and most suitable growing medium is the medium consist of Boggy soil: Sand- 3: 1. for *Echinodorus parviflorus* 'Tropica'.

References

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