

**DETERMINATION OF SUITABLE HARDENING  
SYSTEM AND SUBSTRATE FOR  
MICROPROPAGATED *Anubias nana* AND  
*Lagenendra thwaitesii* SPECIES**

A dissertation submitted to the  
Faculty of Animal Science and Export Agriculture  
Uva Wellassa University  
In partial fulfillment of the requirement of  
The degree of  
Bachelor of Science in Aquatic Resources Technology.

by

**JAYASINGHE ARACHCHIGE RUWANI ANUPAMA  
JAYASINGHE**

**Department of Animal Science  
Faculty of Animal Science and Export Agriculture  
Uva Wellassa University**

**2017**

## ABSTRACT

*Lagenandra thwaitesii* and *Anubias nana* which belong to the family of Aaraceae are considered as highly demanded ornamental aquatic plants in the world. Micro-propagation is used as a tool for large scale multiplication of these plants. At the commercial scale, these plants are faced with a major limitation, which is high mortality in transferring of micro-propagated plantlets from the laboratory to the environment. This study mainly focused on examining an effective hardening system and substrate for *L. thwaitesii* and *A.nana*. Six weeks aged uniform samples of in-vitro rooted *L. thwaitesii* and *A. nana* plantlets were hardened by three different substrates; coconut husk, clay bricks shards and river gravels and three different hardening systems; aquaponic, hydroponic and pot. The performance of plantlets in each substrates was measured using survival and growth parameters such as length of roots, shoots and leaves, wet weight of plantlets, during seven weeks of the hardening period. The collected data were subjected to multivariate analysis at  $P < 0.05$  level. According to the results, systems were significantly affecting on growth performance of *L. thwaitesii* and *A. nana*. Highest average values for *L. thwaitesii*; leaf length ( $17.73 \pm 1.11$ ), shoot length ( $33.87 \pm 1.31$ ), root length ( $73.97 \pm 2.94$ ) and wet weight ( $0.55 \pm 0.03$ ). Highest average values of *A. nana*; leaf length ( $23.54 \pm 1.42$ ), shoot length ( $35.01 \pm 1.14$ ). These values were recorded from the aquaponic system. Root length ( $85.44 \pm 4.23$ ) and wet weight ( $0.85 \pm 0.49$ ) of *A. nana* were recorded in hydroponic system. The 100% survival was obtained for both species in aquaponic system. Highest growth performance of *L. thwaitesii* was given in coconut husk and bricks' shards. All the mentioned three substrates are suitable for hardening of *A. nana*. The most suitable hardening system for these two species is the Tilapia based aquaponic system. This novel trend in integrated aquaculture system is useful to overcome the practical hardening problems in micro-propagation of *L. thwaitesii* and *A. nana* plants, as a valuable asset for ornamental aquatic plant industry.