Indian Journal of Tropical Biodiversity

HYDROPONIC ACCLIMATIZATION OF MICROPROPAGATED BAMBOO PLANTLETS

ALMAS KHANNAM, TRESA HAMALTON*, SOMASHEKAR PV, CHANDRAKALA D
Silviculture and Forest Management Division,
Institute of Wood Science and Technology, Bengaluru, Karnataka, India
**Corresponding author email: tresa@icfre.org*

ABSTRACT: The study is focused on testing the efficiency of early acclimatization of tissue cultured bamboo plantlets using hydroponic techniques. This protocol ensures both the *ex vitro* acclimatization of plantlets obtained through *in vitro* rooting stage, and the *ex vitro* rooting and acclimatization of shoots obtained in the multiplication stage. The present study is novel, as it has no role of fertilizers or bio-stimulators and water oxygenation by bubbling is not provided. In order to increase growth and reduce mortality in plantlets at the acclimatization stage, a one stage *ex vitro* rooting and acclimatization in floating cell trays was tried in bamboo. Results showed that direct *ex vitro* rooting in hydroponic was successful in *D. asper* with rooting percentage of more than 98%, and also in *D. brandisii* with rooting percentage above 95%. Early acclimatization of *in vitro* rooted plantlets was also successfully carried out in *D. asper* and *D. brandisii* resulting in well developed plantlets with 100% survival rate and enhanced shoot number, shoot length, root number and root length within 28 days period. Direct transplanting of micropropagated plants into potting media required 35-40 days of acclimatization under high humidity conditions with 100% survival, but overall performance was less as compared to plants raised through hydroponics technique. The early development of root and leaf system through hydroponics is advantageous in the establishment of micropropagated plants under nursery conditions serving as a starting point for innovations in the domain of plant biotechnology for several important bamboos.

Keywords: *Acclimatization, bamboo, ex vitro rooting, hydroponic*

Citation: Khannam A, Hamalton T, Somashekar PV, Chandrakala D (2021) Hydroponic acclimatization of micropropagated bamboo plantlets. Indian J Trop Biodiv 29(1):54-59

INTRODUCTION

Hydroponics is a technology for growing plants in nutrient solutions (water containing fertilizers) with or without the use of an artificial medium (sand, gravel, vermiculite, rockwool, perlite, peatmoss coir, or sawdust) to provide mechanical support. The technology was developed from experiments carried out to determine what substances make plants grow (Howard, 1993). Post culture activity of tissue culture technique involves acclimatization and adaptation from the ambient conditions to the existing natural conditions. Success of any micropropagation protocol on commercial scale depends on the ability to transfer plants out of culture room on a large scale at low cost and high survival rates. Tissue culture plants grown under heterotrophic nutrition are unable to survive the environmental changes due to lack of appropriate hardening and adaptation (Patel *et al*., 2015). Acclimatization plays a key role in commercialization of any of the successful tissue cultured plantlets. High mortality is observed during acclimatization of tissue cultured plants due to leaves with less cuticular wax, improper stomatal mechanism, coupled with low photosynthetic activity, making itself vulnerable leading to higher mortality rate. Direct transfer of *in vitro* propagated plantlets to external environment increases mortality percentage of plants because of their inability to survive against biotic and abiotic stresses (Deb and Imchen, 2010). Direct sunlight is harmful for *in vitro* raised plantlets and it leads to wilting