



جامعة الإمارات العربية المتحدة
United Arab Emirates University

The College of Graduate Studies and the College of Food and Agriculture

Cordially Invite You to attend

PhD Thesis Defense

Entitled

EXPLORATION OF UAE NATIVE PLANTS FOR SUSTAINABLE LANDSCAPING IN ARID REGION

by

Mubarak Mohammed S. R. Jaber Al Khaili

Faculty Advisor

Dr. Shyam Kurup, Department of Aridland

College of Food and Agriculture

Date & Venue

10:00 AM

Thursday, 18 April 2019

Room E1-1036, CIT Building Male side

Abstract

In order to maintain sustainability for landscapes in the arid region, the use of native plants is of considerable importance, in the light of the fact that the exotic plants currently used are not resource efficient. The native plants adapted to the harsh environment of the desert ecosystem could play a critical role in this direction where the natural resources could be sustainably used. Research on evaluation and analyzing native plant species of the UAE for potential application in landscapes have been considered. The present investigation reports the results of the exploration of native plants suited for sustainable landscape for resource efficiency. It also encompasses the study pertaining to the response of native grass species identified in the survey and the shrubs to varied levels of irrigation. Further, the germination responses of selected plant species, tissue culture propagation of endangered tree species and their long-term conservation strategies were also part of the study. During plant exploration 63 plants were identified with potential for landscaping out of which, based on further evaluations with specific landscape qualities 30 plant species of different forms were recommended for future landscape use. A native grass *Digitaria* spp. has been located, which is found to have the potential to be used as ground covers in arid landscapes, compared with four grass species, popularly used in landscapes with respect to water usage. The analysis and confirmation of stabilized responses for drought tolerance were done based on morphological responses, elemental status and antioxidant enzyme mechanisms operating under wider frequency of irrigation. In 9 selected shrubs and 1 grass species, irrigation experiment was conducted with a constant irrigation volume under 4 different frequencies. The responses to induced drought was assessed based on the morphological parameters, macro and micro nutrient status that can influence the growth and development. The seeds of fourteen plant species were subjected to germination responses after exogenous application of GA₃ at 400 mg/L and 200 mg/L to accelerate germination, where many of the desert species are recalcitrant in nature. The mean germination time (MGT) was shorter where higher germination is noticed. *In vitro* propagation protocols were standardized in 3 endangered tree species viz., *Moringa peregrina*, *Haloxylon persicum* and *Acridocarpus orientalis* by direct organogenesis as part of *in vitro* conservation and faster multiplication. Long-term storage employing cryopreservation by vitrification and desiccation method was accomplished in the above three species. Based on the findings generated from this study, it is concluded that the use of native plants of the UAE for landscape applications could create resource efficient sustainable landscaping.

Keywords: Native plants, landscaping, germination, irrigation, tissue culture, conservation.