

1.0 INTRODUCTION

Aquatic plants are an integral part of the ornamental fish industry. The value of the ornamental fish industry is expected to increase by 12% per year (DOF, 2011) and the sector is expected to contribute to Malaysia Gross Income (MGI) up to RM630 millions that provides more than 100 jobs. The Malaysian Government is planning to capture business opportunity in ornamental fish export by establishing own branding and marketing channels, without relying on others countries for export of the product. Under the 3rd National Agriculture Policy (1998-2010), ornamental fish and aquatic plants were identified as new product for future industry that can contribute to national fisheries sector. In the 10th Malaysia Plan, ornamental fish sector is identity as one of high value agriculture activities that were be given special focus. And the contribution to Gross Domestic Product (GDP) is expected to increase by 2% by 2015.

The International aquatic plants are sold in the range of USD1.79 to USD5.00 in United States. In Australia the *Cryptocoryne* sp. cost \$5.95. Mass production of the aquatic plants is needed to meet world market demand. Conventional propagation of aquatic plants is time consuming as it takes longer time to reach marketable size and also requires more planting area and prone to disease when it is exposed in open environment.

New varieties of aquatic plants are always sought after in ornamental fish industry. However, naturally mutated aquatic plants occur rarely. Hence the possibility to establish new varieties though induced mutation is an attractive alternative.

Characteristic of the plant under study, *C. xwillisii* are seldom flowers and unfortunately there are no viable seeds. Thus, cross breeding using pollination between different species to obtain new plant variety is not possible. However, *C. xwillisii* is one of

the most popular aquarium plants in the world and a novel variety is very much sought for in order to be competitive in this aquarium business.

Induced mutation by gamma irradiation on *in vitro* culture of aquatic plants was reported by Parkorn T *et al* (2009) on *Anubias congensis*. But there are no published reports on the study of induced mutation on *in vitro* *Cryptocoryne xwillisii*. The present study was done on the species by using physical mutation on tissue culture of *C. xwillisii*. In this study, molecular markers were generated which characterize the genome constitution and diversity of species in *Cryptocoryne* genus and varieties. And the method will also be used for analyzing the relationships of *Cryptocoryne xwillisii* and its sports (clonal mutation).

1.1 Objectives Of The Study

The objectives of this study:

- 1) To develop a micropropagation technique for *Cryptocoryne xwillisii*
- 2) To develop mutants of the *Cryptocoryne xwillisii* through gamma irradiation
- 3) To investigate the taxonomic relationships between different species of *Cryptocoryne* through Inter-Retrotransposon Amplified Polymorphism (IRAP) Analysis
- 4) To compare the IRAP profiles of mutant vs. normal plants