GENETIC DIVERSITY AND TRANSFERABILITY OF EST-SSR MARKERS FOR KELAMPAYAN

Lai Pei Sing[1*], Ho Wei Seng[1] and Pang Shek Ling[2]

[1] *Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak*
[2] *Applied Forest Science and Industry Development (AFSID), Sarawak Forestry Corporation, 93250 Kuching, Sarawak*

*Corresponding author: angel_aips@hotmail.com

ABSTRACT: In Sarawak, forestry is one of the critical revenue resources for the state. However, forests have been degraded rapidly and raw materials for wood product production are getting limited due to the continuous logging. Sarawak government had shown their commitment to protect the environment and ecological service to provide an environmentally sustainable and more cost effective method than harvesting from natural forest by establishing 1 million hectares of planted forest by Year 2020. Expressed sequence tag-simple sequence repeat (EST-SSR) markers had been developed for *Neolamarckia cadamba* (Roxb.) Bosser (Kelampayan), which is chosen for planted forest in Sarawak, to facilitate the selection of high quality and genetically superior seed and seedlings. Two different mother trees and 25 seedlings each were collected for polymorphism screening. A total of 19 EST-SSRs consisting of 98 alleles generate an average of 5.16 alleles per locus. The number of alleles ranged from 1 (NCS16) to 13 (NCS05). The highest observed heterozygosity and PIC value were 0.904 and 0.876, respectively. Moreover, 4 loci were found to be transferable to cross-genera species and Kelampayan was predicted to be genetically closer to *Gardenia jasminoides*. In general, EST-SSR developed in this study possess considerably high level of genetic diversity and transferability and these markers will be valuable resources to exploit the genotyping data for tree improvement as well as conservation of plant genetic resources.

Keywords: EST-SSRs, *Neolamarckia cadamba* (Roxb.) Bosser, Kelampayan, genetic diversity, transferability.

INTRODUCTION

Malaysia is the largest tropical plywood exporter in the world. In order to produce large volume of wood products, the forest resources is reduced rapidly and thus the availability of raw materials for plywood production is getting limited. Sarawak government plans to establish 1 million hectares of planted forest by Year 2020 to provide an environmental sustainable and substantially more cost-effective method than harvesting from natural forest. Various tree species has been chosen for this forest plantation. *Neolamarckia cadamba* (Kelampayan) in this study is chosen for this plan due to the fast-growing characteristic. Kelampayan plays important role in plywood and furniture manufacturing. It also used in pulp and paper, canoes, boxes and crates production. Furthermore, the extracts of Kelampayan possess various medical uses, such as wound healing, analgesic, antimicrobial, hepatoprotective, anti-inflammatory, antipyretic, antidiarrhoeal, antihelmintic, diuretic, laxative antidiabetic, sedative and antiepileptic activities of the plant.

In order to develop a more productive planted forest than natural forest, the use of high quality seeds and seedlings or genetically superior planting material is important to ensure a profitable return in the future. However, the conventional selection of high quality planting materials for timber species by capturing offspring with desired traits requires large space and long generation times. Therefore, the applications of biotechnology is a rapid method that helps in timber tree breeding program by improving wood quality, disease and pests resistance and