Physiol Mol Biol Plants (January–March 2015) 21(1):163–165
DOI 10.1007/s12298-014-0262-2

SHORT COMMUNICATION

Development and characterization of microsatellite markers in sawih tree (*Duabanga moluccana* Blume) using ISSR-suppression PCR techniques

Kit-Siong Liew · Wei-Seng Ho · Shek-Ling Pang · Abdullah Julaihi

Received: 17 June 2014 / Revised: 27 August 2014 / Accepted: 12 September 2014 / Published online: 24 September 2014

Abstract *Duabanga moluccana* (or locally known as sawih) is an indigenous fast growing tropical tree species that confers various advantages for the timber industry and for planted forests development. In this paper, we isolated and characterized 8 polymorphic microsatellite markers from the *D. moluccana* genome using ISSR-suppression PCR techniques. The number of alleles and PIC values ranged from 3 to 8 alleles per locus and from 0.488 to 0.792, respectively. Three microsatellite loci were deviated from Hardy-Weinberg equilibrium ($P<0.05$). The transferability rate ranged from 24 to 100 % among the three indigenous tree species tested. This indicates that the newly developed microsatellite markers would be useful tools for population genetic studies on *D. moluccana* and other indigenous tree species.

Keywords Microsatellite markers · ISSR-PCR · *Duabanga moluccana* · Planted forest · Population genetics

Rapid socio-economic changes in the world are having profound impacts on all sectors, including forestry. While demand for wood products is increasing, so is the demand for environmental services of forests. However, these slow growing trees with long generation intervals are unable to meet current global demand for wood, resulting in the loss and degradation of natural forests by logging (Fenning and Gershenzon 2002). The alternative now is to farm trees in plantations composed of fast-growing species with short rotation cycle of 6 to 8 years. The rationale is that natural forests at the most produce about 3 m^3/ha/year of timber, whereas plantations can produce annually from 10 to 30 m^3/ha of timber (Krishnapillay and Razak 2001). Hence, plantations development will serve as a strategy for maintaining a sustainable supply of timber and at the same time, reducing the logging pressure on natural forests for wood production to an acceptable level. In the present study, we have developed and characterized microsatellite markers from the genome of *Duabanga moluccana* (sawih) that would be useful for generating baseline genetic information for tree improvement and conservation programmes of this species. *D. moluccana* has been targeted as one of the fast growing indigenous tree species for planted forest development in Sarawak, Malaysia (Ho et al. 2010). It is widely distributed at 15–750 m altitude on damp clay-rich fertile soils, especially in high light intensity areas such as rivers-banks, forest-edges, logged-over forests, road-sides, abandoned cultivation sites and limestone hills (Bojo 1995). The trees are of great economic importance for production of various wood works and products such as plywood, veneer and pulping.

Microsatellite markers were isolated using two ISSR-suppression PCR techniques as proposed by Lian et al. (2001, 2003, 2006). This method has been used by researchers in developing microsatellite markers for species with little genomic information (Tamura et al. 2005, Sui et al. 2009; Qosim et al. 2011; Xie et al. 2011; Liu et al. 2013). Total genomic DNA was extracted from young leaves of *D. moluccana* according to the protocol modified from Doyle and Doyle (1990). Five ISSR primers, $(AC)_{10}$, $(AG)_{10}$, $(GTG)_6$, $(AC)_6(AG)_5$ and $(TC)_6(AC)_5$ were employed. The ISSR-PCR amplification was carried out in a Mastercycler Gradient PCR (Eppendorf, Germany). The amplification products were resolved on 1.5 % agarose gels and fragments of 400 bp - 3 kb were recovered by using the QIAquick gel

K.-S. Liew · W.-S. Ho (✉)
Forest Genomics and Informatics Laboratory (fGiL), Department of Molecular Biology, Faculty of Resource Science & Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia
e-mail: wsho@frst.unimas.my

S.-L. Pang · A. Julaihi
Applied Forest Science and Industry Development (AFSID), Sarawak Forestry Corporation, 93250 Kuching, Sarawak, Malaysia