

Genetic Variability in Apomictic Mangosteen

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ABSTRACT

Mangosteen (*Garcinia mangostana* L.) originated from natural hybridization of *G. malaccensis* and *G. hombrioniana*. Mangosteen is reproduced from adventitious embryo, from which the seed develops without fertilization, i.e. agamospermy or apomixis. Apomictic reproduction mode leads to the idea that the mangosteen population is genetically uniform. However, field evaluation showed variability in both of vegetative and reproductive characters. Further studies using isoenzyme and RAPD markers confirmed the genetic variability among the mangosteen population. Isoenzyme marker also elucidates high variability among *Garcinia* genus, and did not support the idea of the single origin of *G. mangostana*. Furthermore, ERAPD and RAPD analysis on parental tree and its progeny shows genetic variability, and deep analysis on polyembryony seedlings from the same seed also show variability on RAPD banding pattern.

INTRODUCTION

Based on its reproductive mode, mangosteen has been classified as an apomictic plant (Horn, 1940; Richards, 1997). This plant is propagated through apomictic seed, of which embryo is formed without reduction of the chromosome number and fertilization of the egg (den Nijs and van Dijk, 1993). Apomixis in mangosteen implies that same genetic properties of parent spread to its progenies (Koltunow et al., 1995); Apomictic processes occur in the ovule without fertilization, resulting in progeny that are genetically exact copies of the female plant (Koltunow et al., 1995). Based on this assumption, mangosteen is claimed as a species with narrow of genetic variabilities and noticed as a single clone.

Mangosteen (*Garcinia mangostana* L.) belongs to the *Guttiferae* family and the genus *Garcinia* (Verheij, 1991). *Garcinia* is a large genus that consists of about 400 species (Campbell 1966; Richards, 1990). Based on morphological and cytological studies, Yaacob and Tindal (1995) proposed that mangosteen originated from South East Asia, and is an allotetraploid derivate of *Garcinia hombrioniana* ($2n=48$) and *Garcinia malaccensis* ($2n=42$). This suggestion has been confirmed on our recent finding using isozymes and Amplified Fragment Length Polymorphism (AFLP) markers (Sinaga et al. 2007, unpublished data). Almeyda and Martin (1976) proposed that mangosteen is a native of Indonesia. In Indonesia, mangosteen is distributed almost throughout the archipelago, with the main populations in Sumatra and Kalimantan (Mansyah, et al., 1999). However the production centers of mangosteen are in West Sumatra, West Java, Central Java, East Java, and Bali. Commercial production has been limited by slow tree growth and long juvenile periods (10-15 years).