

New evidence on the origin of mangosteen (*Garcinia mangostana* L.) based on morphology and ITS sequence

Abstract

Mangosteen (*Garcinia mangostana* L.), known as one of the most desirable tropical fruits of Southeast Asia, has been considered as an obligate agamosperous hybrid, thought to have arisen from two wild species, *G. celebica* L. (syn. *G. hombroniana* Pierre) and *G. malaccensis* Hook. f. However, this putative origin was based on a misidentification of *G. malaccensis*, which was confused for *G. penangiana* Pierre. Intensive field studies and molecular investigations based on internal transcribed spacer (ITS) sequence data of 22 samples were conducted, which included six samples of true *G. malaccensis*. Morphological observation shows that mangosteen highly resembles *G. malaccensis*, particularly in its vegetative and fruit characters, even sharing similar taste of ripe fruits. ITS data revealed that mangosteen shared more than 99 % of its sequence with *G. malaccensis* with a few accessions identical with wild populations in Peninsular Malaysia. Phylogenetic analysis revealed that clades of mangosteen are paraphyletic per se, but monophyletic if both mangosteen and *G. malaccensis* are grouped together. This shows that mangosteen and *G. malaccensis* are so closely related that they should be combined together as one species. I propose two theories on the origin of mangosteen, first, that it is a hybrid of different varieties of *G. malaccensis*, and second, that it may be a product of multiple, superior selections from different populations of female trees of *G. malaccensis* originating in Peninsular Malaysia.

Keyword: *Garcinia malaccensis*; *Garcinia mangostana*; Peninsular Malaysia; Wild relatives