Utilization of molecular markers to detect the authenticity of cocoa clones

ABSTRACT

Cocoa (Theobroma cacao L.), the main source of cocoa-based products and chocolate, must be conserved live in situ or ex situ as its seeds do not remain viable for more than a couple of weeks once the pod has been harvested. The Malaysian Cocoa Germplasm Collection (MCGC) is one of the ex situ collection of cocoa clones, the fourth largest in the world and regularly importing new clones from other cocoa genebank as well as exporting clones to other countries. The MCGC has been established since 1992 and currently holding more than two thousands imported and local cocoa clones. As in many germplasm collection centres, mislabeling is a critical known problem and correction of the problem is crucial to improve the information reliability and efficient management of germplasm. Using microsatellite DNA markers, the germplasm collection was assessed in its amount of synonymies and homonymies. Comparison of homonymous plants across the collection revealed a significant misidentification rate estimated to be 37.3% and 10.87% synonymous errors. The microsatellite DNA markers amplified a total of 182 alleles with mean allelic richness of 18.2 alleles per locus and average polymorphism information content (PIC) value of 0.9948. The observed heterozygosity (Hobs) is 0.6855, indicate a high allelic diversity in this collection.