Genotyping of Sarawak rice cultivars using microsatellite markers

ABSTRACT

Genetic diversity of 53 Sarawak rice cultivars, originating from Southern Sarawak, was assessed using 54 microsatellite markers. Initial polymorphism detection was conducted using 54 primer pairs distributed on 12 rice chromosomes. Polymorphic markers were chosen from the initial screening results in order to obtain microsatellite marker panels that can differentiate the rice cultivars undertaken in the study. The chosen microsatellite marker panel consisted of RM1, RM240, RM489, RM252, RM413, RM204, RM11, RM404, RM316, RM271, RM206, and RM19, with one representative from each chromosome. A total of 43 alleles were detected with an average of 3.58 alleles per locus. The polymorphism information content (PIC) values obtained from the microsatellite marker panels ranged from 0.306 to 0.730, with an average of 0.622. The Unweighted Pair Group Method with Arithmetic Mean (UPGMA) dendrogram (r = 0.789) revealed 2 major groups with 6 sub-clusters and the wide range of similarity values (0.24-1.0) obtained showed a high degree of diversity among the cultivars. The results suggest microsatellite markers as a useful tool for the estimation of genetic diversity and cultivar differentiation and present invaluable genetic information for future breeding and association mapping efforts.

Keyword: Rice; Microsatellite markers; Polymorphism; Genetic diversity; Sarawak