Genetic diversity of Sabah rice cultivars using random amplified polymorphic DNA (RAPD) markers

ABSTRACT

Rice is the most important staple crop in Malaysia and is cultivated all over the country, including the state of Sabah. The uniqueness of rice cultivation in Sabah lies in the type of rice itself, deriving mainly from local or non-commercial cultivars but with distinctive characteristics including long grains, aromatic properties, and drought tolerance. However, despite having these important agricultural traits, information on the genetic diversity of Sabah rice remains limited. Hence, the purpose of this study was to determine the genetic polymorphisms of Sabah rice using random amplification of polymorphic DNA (RAPD) markers. A total of 101 alleles were profiled, from which 94% were identified as polymorphic. Phylogenetic analysis grouped the rice samples into three clusters, with two clusters classifying the ability of rice to grow under different planting conditions, suitable for growth irrigate and upland condition. The first cluster was dominated by cultivars that could survive in wet (irrigated) areas, while the other featured those that were found in dry (upland) areas. Furthermore, two alleles, OPA- 05-B2 and OPA-01-B11, were found to be unique to cultivars within the upland cluster and were thus proposed to be involved in dry environmental adaptation. The results of the present study provide an insight into the genetic relationships and diversity of Sabah rice.