

Khin Myo Myint 2012: Molecular Diversity of Aromatic Rice Gene in Different Isozyme Groups. Doctor of Philosophy (Tropical Agriculture), Major Field: Tropical Agriculture, Faculty of Agriculture.

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Aromatic rice is an important commodity in international trade. The recessive *Os2AP* gene located on chromosome 8 has been reported to be associated with rice aroma. The 8-bp deletion in exon 7 is an aromatic allele present in most aromatic accessions, however, other mutations associated with aroma have been detected, but in less frequent. In this study, we report an aromatic allele, a 3-bp insertion in exon 13 of *Os2AP*, as a majority allele found in aromatic rice varieties from Myanmar. The insertion is in frame and causes an additional tyrosine (Y) in the amino acid sequence. However, the mutation did not affect the expression of the *Os2AP* gene. A functional marker for detecting this allele was developed and tested in an aroma-segregating F₂ population. The aroma phenotypes and genotypes showed perfect co-segregation in this population. The marker was also used for screening a collection of aromatic rice varieties collected from different geographical sites of Myanmar. Twice as many aromatic Myanmar rice varieties containing the 3-bp insertion allele were found as compared to rice varieties containing the 8-bp deletion allele, which suggested that the 3-bp insertion allele originated in regions of Myanmar.

Existing aromatic rice varieties have been known as belonging in Isozyme group 1, 5 and 6. SSR were able to retrieve the well-established classification into Indica (isozyme group 1), Japonica (group 6, comprising temperate and tropical forms) and specific groups from the Himalayan foothills including some Aus varieties (group 2) and some aromatic varieties (group 5). In this study, they revealed a new cluster of accessions close to, but distinct from, non-Myanmar varieties in group 5. With reference to earlier terminology, we propose to distinguish a group “5A” including group 5 varieties from the Indian subcontinent (South and West Asia) and a group “5B” including group 5 varieties from Myanmar. In Myanmar varieties, aroma was distributed in group 1 (Indica) and in group 5B and very less in group 5A. New *Os2AP* variants were found, including a 43 bp deletion in the 3' UTR that was not completely associated with aroma. Some accessions of group 5B displayed a particular *Os2AP* allele with a 3 bp insertion and 100% association with aroma, suggesting that this allele appears to have remained more localized than 8bp deletion allele which is found in Isozyme group 1,5A and 6.

Student's signature

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