

Discovery of a major allele of *Os2AP* in Myanmar aromatic rice

Khin Myo Myint^a, Siwaret Arikrit^b, Anucha Plabpla^b, Samart Wanchana^c, Brigitte Courtois^d, Jean-Christophe Glaszmann^d, Apichart Vanavichit^{b,e}

^aInternational Program of Graduate School in Tropical Agriculture (RGJ Ph.D), Kasetsart University, Kamphaengsaen Campus, Nakon Pathom 73140, Thailand

^bRice Science Center and Rice Gene Discovery, Kasetsart University, Kamphaeng Saen, Nakhon Pathom 73140, Thailand

^cInternational Rice Research Institute, Los Baños, Laguna, Philippines

^dCirad, UMR AGAP, Avenue Agropolis, 34398 Montpellier, France

^eDepartment of Agronomy, Kasetsart University, Kamphaeng Saen, Nakhon Pathom 73140, Thailand

Introduction and Objective

The recessive *Os2AP* gene located on chromosome 8 has been reported to be associated with rice aroma because it has a key role in the synthesis of 2-acetyl-1-pyrroline (2AP). The 8-bp deletion in exon 7 is an aromatic allele present in most aromatic accessions. In this study, we chose among aromatic rice varieties collected from different location of Myanmar to identify the aroma gene and aromatic allele specific to Myanmar aromatic rice varieties as well as to develop the functional marker for breeding programs and genetic resource conservation programs.

Methods

Myanmar rice varieties were used for characterizing the *Os2AP* gene mutations. Aroma evaluation by sensory test and 2AP quantification were performed. The expression of *Os2AP* was analyzed by RT-PCR. The *Os2AP* gene was sequenced to further investigate whether the other type of gene mutation was present in this gene. A functional marker designed based on the sequence variation was developed and used for screening of aromatic rice germplasm. Genetic diversity of Myanmar accessions and other aromatic varieties were analyzed by 19 SSR markers.

Results

A new allele with 3 bp insertions on exon 13 was observed in Myanmar aromatic rice varieties. 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. In screening of aromatic rice germplasm, 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. In analysis of variation in 19SSR loci, Myanmar accessions with new aroma allele were found as a new cluster of varietal groups.

Conclusion

3-bp insertion is the major aroma allele in Myanmar rice varieties and the prominent aromatic rice varieties with this allele belong to a new varietal group among other aromatic rice varieties.

Keywords: aromatic rice, 2-acetyl-1-pyrroline, major allele, functional marker

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