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**01e. Characterization and evaluation of rice genetic diversity, including 'omics'**

**THE STUDY OF BADH2 SEQUENCE VARIATION TO UNDERSTAND GENETIC DIVERSITY OF LANDRACE AND WILD AROMATIC RICE IN THAILAND.**

*A. Plabpla*<sup>1</sup>, *K. Myint*<sup>2</sup>, *T. Toojinda*<sup>1</sup>, *S. Chotechuen*<sup>3</sup>, *C. Vutiyano*<sup>4</sup>, *B. Courtois*<sup>5</sup>, *A. Vanavichit*<sup>1</sup>

<sup>1</sup>Rice Gene Discovery Unit BIOTEC, Kasetsart University, Nakhon-Pathom, Thailand

<sup>2</sup>Plant Biotechnology Centre, Ministry of Agriculture and Irrigation, Yangon, Myanmar (Burma)

<sup>3</sup>-, Pathum Thani Rice Research Center, Pathum Thani, Thailand

<sup>4</sup>-, Rice Department of Thailand, Bangkok, Thailand

<sup>5</sup>Cirad, UMR AGAP, Montpellier, France

**Purpose:**

To study genetic diversity and classification of landrace varieties and wild rice, *O. rufipogon*, in Thailand via grain aroma trait.

**Approach and methods used:**

480 Thai landrace rice varieties were used to study natural variation of grain aroma trait. Genotyping was performed by five *BADH2* gene specific markers included three functional markers, Aromarker, 3In2AP, and FMbadh2-E2B together with two non-coding markers 5'SSR and 3'Indel. Isozyme group and genome background of 250 selected Thai landrace varieties were investigated by 19 SSR markers compared to MiniGB dataset and F-AFLP, respectively. 148 and 60 accessions of *O. rufipogon* and *O. nivara*, were genotyped by *BADH2* functional markers. Sequence of aromatic wild rice were compared to Thai landrace rice varieties, *O. glaberima* and other *O. sativa* *BADH2* sequence from public database.

**Key results:**

Thai landrace rice varieties, included phase 'Hom' in name, were classified into 27 haplotypes by five *BADH2* specific markers. Genotyping shown 315 out of 480 varieties contained 8 bp deletion allele, functional marker on exon 7. Isozyme-grouping analysis by SSR markers of landrace varieties compared with MiniGB dataset suggest almost Thai landrace varieties belong to isozyme group I. However, aromatic landrace varieties can separated into 5 genome background by Fluorescent AFLP fingerprinting. Eight bp deletion allele was presented in 4 wild rice accessions from Phitsanulok, Sukhothai, Trat and Nakorn Ratchasima province. 2AP content of aromatic *O. rufipogon* was approximately 0.62 ppm. SNP on *BADH2* were detected when compared wild aromatic rice with *O. glaberima* and other *O. sativa* *BADH2* sequence from public database.

**Synthesis and Applications:**

The natural mutant and diversity of landrace and wild aromatic rice in Thailand were explored. Aromatic landrace rice in Thailand carries the well-known 8-bp deletion on *BADH2*. However, 165 varieties were not contained 8-bp deletion allele although, they had phase 'Hom' in name. The recombination event occur in small region *BADH2* from 5'SSR, (TA)<sub>n</sub> on intron 2, and 3'Indel, 43 bp deletion on 3'UTR. Aromatic landrace rice contained 8-bp deletion allele has different genome background. Variant aromatic landrace varieties can use as a good germplasm source for breeding program.