

Siriphorn Jangsutthivorawat 2008: Genetic Diversity of Starch Synthesis Genes in Rice. Doctor of Philosophy (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Mr. Hugo Volkaert, Ph.D. 114 pages.

Starch composition and cooking quality of the rice grain are important characters of interest to breeders. One hundred and ninety-four accessions of *Oryza* were assayed using PCR-SSCP and alleles at seven starch synthesis genes loci (GBSSI, SSSIIIa, SSSIIIb, SSSIVa, SSSIVb, RBE1 and RBE3) were identified. The nucleotide sequences corresponded to each of the observed SSCP patterns. The frequency of nucleotide polymorphism in this study is about one SNP per 29 bp. At the (CT)_n region in the GBSSI locus, four new alleles were observed (CT)₇, (CT)₉, (CT)₁₀ and (CT)₁₂. Allele (CT)₇ was present only in Thai rice and the ORF-100 deletion types rice. We found two LD block observed in GBSSI and SSIV-1 loci and four LD groups, including polymorphism from different loci, were detected at $r^2 > 0.2$ and $P < 0.05$ indicating relationship between haplotype of seven gene loci. For association analysis, 13, 5, 5 and 1 polymorphisms from GBSSI, SSSIIIa, SSSIVa and SSSIVb, respectively, were significantly associated with AAC, especially, 7 polymorphisms from GBSSI were significant at $P < 0.0001$. Whereas, 10, 9, 7 and 1 polymorphisms from GBSSI, SSSIVa SSSIVb and RBE1, respectively, were significantly associated with GT, especially, one polymorphism from GBSSI were significant at $P < 0.01$. Finally, 11, 3 and 1 polymorphisms from GBSSI, SSSIIIa and SSSIVb, respectively, were significantly associated with GC, especially, 2 polymorphisms from GBSSI were significant at $P < 0.0001$. The observed sequence polymorphisms can also be developed into SNP detection assays for rapid screening in rice breeding programs.

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