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## Analysis of Gene-specific Molecular Markers for Biotic and Abiotic Stress Resistance in Tropically adapted Japonica Rice Varieties

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### [Abstract]

Since 1992, the Rural Development Administration (RDA), Republic of Korea in collaboration with International Rice Research Institute (IRRI) has developed 6 japonica rice varieties (MS11, Japonica 1, 2, 6, 7 and Cordillera 4) that are adaptable to tropical regions. However, these varieties show moderate resistance or susceptibility to certain biotic and abiotic stress. The development of varieties with more stable forms of resistance is highly desirable, and this could be possibly achieved through rapid introgression of known biotic and abiotic resistant genes. In this study, we analyzed the allele types of major biotic stress resistant genes including *Xa5*, *Xa13*, *Xa21* and *Xa25* for bacterial leaf blight, *Pi5*, *Pi40*, *Pish* and *Pita2* for blast, *tsv1* for rice tungro spherical virus, and *Bph6*, *Bph9*, *Bph17*, *Bph18* and *Bph32* for brown planthopper by using gene-specific molecular markers. In addition, seed quality related genes *Sdr4* for preharvest sprouting and *qLG-9* for seed longevity were also analyzed. The results revealed that *Xa5* and *Xa25* resistance alleles showed in all varieties while *Pi5* resistance allele showed only in MS 11. The *Pish* resistance allele were present in five varieties except for Japonica 1. Meanwhile, for the rest of the genes, no presence of resistance alleles found in six varieties. In conclusions, most of tropical japonica varieties are lack of the major biotic stress resistant genes and seed quality genes (*Sdr4* and *qLG-9*). Moreover, the results indicated that rapid deployment of a few major genes in the current tropical japonica rice varieties is urgent to increase durability and spectrum of biotic stress resistance and also seed dormancy/longevity which are essential traits for tropical environments.

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