

Supanyika Sengsai 2006: Improvement of Rice KDML105 for Bacterial Blight Resistance by Backcross Method, Anther Culture and Marker Assisted Selection. Doctor of Philosophy (Genetics), Major Field: Genetics, Department of Genetics. Thesis Advisor: Professor Pradit Pongtongkam, MS. 103 pages. ISBN 974-16-2435-2

To improve the resistance of Thai aromatic rice KDML105 to bacterial blight, a combination of backcrossing method, anther culture, and marker assisted selection were used. Seven BC<sub>1</sub>F<sub>1</sub> (KDML105//IRBB5/KDML105) plants having resistant gene, which were heterozygous for *xa5* locus, were selected by RG556 PCR-based marker. After pathogen inoculation test on the 318 BC<sub>1</sub>F<sub>2</sub> progenies of these seven plants, twelve plants were determined as resistant (R) and one plant was highly resistant (HR). Genotyping of the surviving eleven R and one HR plants by AFLP analysis revealed that the number of recurrent parental alleles (KDML105) recovered in the individuals was found ranging from 67.13% to 82.19%. These resistant plants were also homozygous for *xa5* locus. Anthers from seven BC<sub>1</sub>F<sub>1</sub> plants having resistant gene gave the highest percentage of callus formation (10.19%) when cultured on N<sub>6</sub> medium supplemented with 2 mg/l NAA, 2 mg/l 2,4-D, 3 mg/l kinetin, 500 mg/l casein hydrolysate, and 50 g/l maltose. However, the highest percentage of green plant regeneration was obtained (1.29%) from calli which had been grown in N<sub>6</sub> medium without 2,4-D and cultured on regeneration medium (MR1) containing MS supplemented with 2 mg/l BAP, 0.2 mg/l NAA, 300 casein hydrolysate, 15% coconut water, and 30g/l sucrose. AFLP analysis of all six anther-derived plants detected 57.3% to 67.12% recurrent parental alleles. After planting, seed setting in two out of six anther-derived plants indicated the occurrence of spontaneous chromosome doubling in these plants. Unfortunately, PCR-based marker RG556 did not find any of these six plants to be bacterial blight resistance.

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Student's signature

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Thesis Advisor's signature