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Development of Hybrid Rice Variety (PR40638) with Bacterial Leaf Blight Resistance

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Abstract

Bacterial leaf blight (BLB) disease is one of the most serious diseases in hybrid rice production because of the susceptibility of the parent lines and hybrids. Yield losses could cause up to 20–30 % and could reach as high as 80 % if susceptible plants are used. Development of resistant cultivars is an effective approach to combat bacterial blight. This study aimed to develop hybrid parent lines (PR²8A and PR³9902–19R56) and hybrid (PR40638) with introgressed Xa21 gene for BLB resistance and to evaluate these breeding lines based on phenotype and genotype data. PR40638H, is an improved version of the Mestiso 3 (M3) hybrid with introgressed Xa21 gene that confers broad spectrum resistance to BLB. Based on the evaluation, there is no significant difference between IRBB52 (resistant check) with pyramided Xa4+Xa21 genes, PR²8A (improved CMS line), PR³9902–19R56 (improved restorer line), and PR40638H (improved Mestiso 3 hybrid) in terms of disease reaction against 14 isolates representing 10 Philippine races of *Xanthomonas oryzae* pv. *oryzae* (Xoo). The morpho-agronomic traits between the improved and original parent lines showed some dissimilarity but this could be overcome by further backcrossing. This proved the successful pyramiding of BLB resistance genes on parent lines and hybrid Mestiso 3. In terms of yield, Mestiso 3 has a maximum yield of 8.6 t/ha, whereas PR40638H can offer a yield of as high as 9.7 t/ha in both dry and wet seasons. This hybrid with superior yield and disease resistance could be used to increase rice production to attain rice sufficiency and increase the country's competitive advantage on the onset of ASEAN economic integration.

Keywords: BLB, hybrid parent lines, hybrid rice, Mestiso 3, PR40638H