

ABSTRACT FORM

TITLE

Improving resistance of hybrid rice parental lines to bacterial blight

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Casiana M. Vera Cruz¹, Joan Marie Agarcio^{1,2}, Lucia Borines^{1,3}, Samuel A. Ordoñez², Neil Baliuag², Arlen de la Cruz², Dindo A. Tabanao², Marina P. Natural⁴, Brad W. Porter⁵, Frank F. White⁵, Hei Leung¹, and Edilberto D. Redoña¹

AUTHOR INFORMATION (Department, Institution, Address, Tel & Fax, E-mail)

¹Plant Breeding, Genetics and Biotechnology Division, International Rice Research Institute, DAPO Box 7777, Manila, Philippines; ²Philippine Rice Research Institute, Muñoz, Nueva Ecija, Philippines; ³Department of Pest Management, Leyte State University, Visca, 6521-A, Baybay, Leyte, Philippines; ⁴Department of Plant Pathology, University of the Philippines, Los Baños, Laguna, 4031, Philippines; ⁵Department of Plant Pathology, 4024 Throckmorton Plant Science Center, Kansas State University, Manhattan, KS 66506, USA

IRRI Tel: +63 (2) 580-5600 ext. 2727, Fax: +63 (2) 580-5699, E-mail: c.veracruz@cgiar.org

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ABSTRACT (maximum 350 words)

Compared to China, hybrid rice technology is relatively new in other tropical Asia, but the area planted to hybrid rice is continuously growing. Bacterial blight (BB), caused by *Xanthomonas oryzae* pv. *oryzae* (*Xoo*), has been considered a major constraint to hybrid rice cultivation in the Philippines, Vietnam, India, and other Asian countries. To improve the level of resistance, bacterial blight resistance from donor lines carrying *Xa4*, *Xa7*, and *Xa21* genes was introgressed into two sets of parental hybrid rice lines: (1) maintainer lines IR58025B, IR68888B, IR68897B, IR62829B, LianB, 913B, and BoB, and (2) restorer lines IR34686-179-1-2-1R, IR62161-184-3-1-3-2R and IR60819-34-2R. Phenotypic analysis of plants with gene pyramids showed that these lines provide broad-spectrum resistance to *Xoo*. To improve maintainer lines, bi-directional marker-assisted selection (MAS) was used to refine the selection process for the advanced IR58025B progenies (BC₄F₁), which carry the target bacterial blight resistance genes singly or in combination, and these progenies were further selected for the absence of restorer genes using two *Rf* markers. For the restorer lines, direct selection using MAS for the presence of *Xa4*, *Xa7*, *Xa21* and combinations was done. Using DNA fingerprinting to determine the level of parental genotype recovery among the progeny lines, a high level of similarity with the original parental genotype was achieved in the advanced lines. The selected maintainer lines IR58025B-BB, IR68888B-BB and IR68897B-BB and restorer lines IR34686-179-1-2-1R-BB, IR62161-184-3-1-3-2R-BB and IR60819-34-2R-BB showed improved bacterial blight resistance and will be used in the future to produce BB-resistant *Mestizo* hybrids, the most widely used hybrid in the Philippine hybrid rice commercialization program. These improved lines are currently available as a resource for bacterial blight resistance for hybrid rice production programs.

Dr. Kiyoshi Kurosawa
(Editorial board of JSPS Seminar 2007)
Associate Professor

Institute of Tropical Agriculture, Kyushu University
6-10-1 Hakozaki, Higashi-ku, Fukuoka 812-8581, Japan
Phone & Fax +81-92-642-3075
E-mail: kurosawa@agr.kyushu-u.ac.jp