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The Blb Resistance Gene Xa7 in Rice Lines Derived from Double Crossing of Local Rice

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Abstract

The Indonesian local rice germplasms have long been cultivated by farmers as the potential alleles for abiotic and biotic stresses. These among others are IR4 which is phosphorous (P) deficiency tolerance, Parekaligolara which has a bacterial leaf blight (BLB) resistance gene, BIO110 which is resistant to BLB and blast, and Markuti which has genes associated with Fe tolerance trait. Infection of BLB disease is one of the important limiting factors in rice production in Indonesia. The causal agent of this disease is *Xanthomonas oryzae* pv. oryzae (Xoo). Fifty double haploid rice lines derived from double crossing between local rices IR54/Parekaligolara and Bio110/Markuti (BMIP) were used to screen the resistant lines using four primers to amplify the Xa7 resistance genes. The four primers used as marker assisted selection were RM20589, RM20590, LD34, and LD40 to search for polymorphic bands. The three primers RM20589, LD34, and LD40 generated polymorphic bands while RM20590 generated monomorphic bands in two BMIP lines, designated as Biosa line 2 and 3. Two hundred seeds from the selected Biosa line 2 were planted in endemic Xoo field in southeast Minahasa regency, North Sulawesi province, in legowo 2:1 parallel system with 25×25 spacing. Through observation of plant phenotypes, the plants were resistant to BLB attack with the intensity level < 5 ($<$ 13–25 %) according to the standard evaluation of IRRI. The plants showed strong stalk, upright plant shapes, and lodging resistance. Each plant had 26–28 tillers. This proved that the Biosa line 2 was resistant to BLB disease and produced rice up to 8.5 $^{\text{ton}}/_{\text{ha}}$ in the experimental field.

Keywords: Bacterial leaf blight, Biosa, BMIP, Xa7 gene

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