Identification of bacterial leaf blight resistance genes in Malaysian local rice varieties

ABSTRACT

Xanthomonas oryzae pv oryzae (Xoo) is a bacterial pathovar that causes a serious bacterial leaf blight disease of rice. This disease poses significant constraint on food security in Asia, as it causes yield loss in rice. There is an urgent need to control bacterial blight disease through resistance cultivars. However, the genetic potential of Malaysian rice cultivars has not been explored. We screened 10 cultivated Malaysian varieties with high yield performance for resistance genes using three simple sequence repeat and two sequence tagged sites markers coupled with phenotypic screening. All 10 rice genotypes were found to carry xa recessive gene. Four genotypes had two resistance genes tightly linked with the specific markers; Mahsuri Mutant carried the dominant resistance genes, xa4 and xa2 whereas NMR152 and the Tongkat Ali mutant had the dominant genes, xa21 and xa2. However, xa13 and xa5 resistance genes were not detected in this Malaysia rice germplasm group. In a greenhouse assessment, genotypes carrying more than a single resistance gene were found to be resistant against Xoo MXO 1410 isolates. These cultivars have potential as genetic materials for rice quality breeding programs.

Keyword: Malaysian rice; SSR marker; STS marker; Xa gene; Xanthomonas oryzae pv oryzae