

Marker-assisted selection and gene pyramiding for resistance to bacterial leaf blight disease of rice (*Oryza sativa* L.)

ABSTRACT

Marker-assisted selection and gene pyramiding are very important breeding strategies for conferring broad spectrum and durable resistance against diseases causing yield loss in rice. One such disease causing major set backs in rice production is bacterial leaf blight (BLB) caused by the pathogen *Xanthomonas oryzae* pv. *oryzae*. Molecular markers are very essential in both marker-assisted selection and pyramiding of genes, hence, many molecular marker techniques have already been developed. Presently, the most commonly used ones are DNA-based markers also known as molecular markers. The molecular markers are classified into two major categories based on the techniques used for detecting them. These are hybridization and polymerase chain reaction-based markers. Other types of markers available include the morphological (traditionally based) and biochemical (enzyme-based) markers. Host plant/variety resistance is the most suitable means for controlling BLB disease of rice. Marker-assisted gene pyramiding has the potential to accelerate the breeding programmes and guarantee the durability of resistance conferred in the host plant. Therefore, this paper uncovers the utilization, economic importance, limitations and future prospects of marker-assisted selection and gene pyramiding for resistance to BLB disease of rice.

Keyword: Marker-assisted selection; Gene; Pyramiding; BLB; Bacterial leaf blight disease; Rice *Oryza sativa* L.; Molecular marker