

Marker-assisted selection for rice brown planthopper (*Nilaparvata lugens*) resistance using linked SSR markers

Abstract

Developing cultivars resistant against different biotypes of brown planthopper (BPH) through marker-assisted selection (MAS) is an effective management strategy to control this pest. In this study, 28 polymorphic simple sequence repeat (SSR) markers were analyzed in 108 F₃ progenies derived from the cross of Rathu Heenati and MR276 rice cultivars to investigate the association with BPH resistance against biotypes 2 and 3. For statistical analysis, parents and their offspring were grouped into 2 phenotypic classes based on their levels of BPH resistance. Chi-square analysis demonstrated a good fit to a ratio of 3:1 for the segregation of resistance and susceptibility. Association of SSR markers with phenotypic traits in F₃ progenies were identified. Six SSR markers (RM401, RM5953, RM217, RM210, RM242, and RM1103) were significantly associated with BPH resistance to biotypes 2 and 3 of BPH. Out of these 6 markers, RM401, RM5953, and RM217 accounted for about 17% of total phenotypic variation and RM210, RM242, and RM1103 accounted for 20% of total phenotypic variation against biotypes 2 and 3, respectively. Therefore, the above 6 markers were confirmed for MAS in rice breeding programs to develop BPH-resistant rice cultivars.

Keyword: Bph resistance gene; F₃ progenies; Microsatellites; Rice