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MARKER-ASSISTED BACKCROSSING FOR RECOVERY OF RECURRENT PARENT GENOME FROM A CROSS BETWEEN MR264 AND PONGSU SERIBU 2 RICE VARIETIES

Background selection is the most crucial step in marker-assisted backcrossing breeding (MABC). The primary goal in this selection is to develop backcross progenies carrying the gene of interest with maximum recovery of the recurrent genome, a process which can take many generations. MABC is the most significant technique to recover the recurrent genome within 2 to 3 generation and minimize the drawbacks of conventional breeding. In this study, MABC technique was adopted for crossing between MR264, a mutant rice susceptible to blast and Pongsu Seribu 2, a traditional Malaysian variety possessing resistant genes (donor) to produce a new blast resistant rice variety. In the present study introgression of the blast resistance genes Pi-kh and Pi7(t) was identified through presence of the tightly linked markers RM5961 and RM206. Out of 375 SSR markers, 72 polymorphic SSR markers between parental lines were used to monitor the recovery of recurrent parent genome in backcross population. Backcross populations, BC1F1 and BC2F1 revealed 76.1 to 87.9% and 86.5 to 95.2% of recurrent parent genome recovery in background analysis, respectively. The average percentage of recipient genome recovery in selected BC2F2 lines was 94.4%, which indicated a close similarity at phenotypic resemblance to the recurrent parent MR264. Seven homozygous plants carrying blast resistance genes having maximum genetic backgrounds of MR264 were selected as improved blast resistant lines for development of a blast resistant variety. Dendogram analysis revealed that the selected BC2F2 lines were clustered together with MR264, which indicates a strong relationship with MR264. This study concluded the on effectiveness of marker-assisted backcrossing for rapid recovery and maximization of the restoration of recurrent parent genome in backcross populations in a mutation breeding programme.

Country or International Organization

MALAYSIA

Primary author: Dr HASAN, NorAishah (Lecturer)

Co-authors: Dr HARUN, ABDUL RAHIM (SENIOR RESEARCHER); Dr MAZLAN, Norida (Lecturer); Dr SYED ALI, Nusaibah (Lecturer); Prof. MOHD YUSOFF, Rafii (Lecturer); Dr ABDULLAH, Shamsiah (Lecturer)

Presenter: Dr HASAN, NorAishah (Lecturer)

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