Identification of Quantitative Trait Loci (QTL) for Awn, Incomplete Panicle Exertion and Total Spikelet Number in an F2 Population Derived from A Backcross Inbred Line, Bio-148, and the Recurrent Parent, IR64

Abstrak

An F2 rice population developed from a cross between a backcross inbred line (BIO-148) and its recurrent parent (IR64) was used to identify quantitative trait loci (QTL) for awn, panicle exertion and total spikelet number. BIO-148 is a BC2F8 line derived from a cross between IR64 (a high-yielding lowland rice variety) and Gajah Mungkur (an upland tropical japonica rice variety). Two hundred plants were grown in the greenhouse, and their DNAs were isolated for genotyping using SSR markers. Panicle exertion was observed during the grain-filling stage. The awn length of the seed and the total spikelet number per panicle were observed after harvesting. A total of four QTLs were identified using single-marker regression with LOD>3, explaining 8.4-18.1% of phenotypic variation. A QTL for awn was identified on Chromosome 8. A QTL for incomplete panicle exertion was identified on Chromosome 4. Two QTLs for total spikelet number were identified on Chromosome 4, in which the BIO-148 allele contributed to a higher number of spikelets per panicle. The QTLs identified in this study will be useful in the improvement of yield potential for modern lowland indica rice varieties by harnessing the hidden useful alleles from upland tropical japonica rice varieties.