ABSTRACT

Two candidate yield-related genes, putative *Receptor-like Protein Kinase 1* (putative *RPK1*) and putative *CLAVATA1 Receptor Kinase* (putative *CLV1*), were selected for molecular characterization and expression analysis. This was carried out using in four rice lines comprising the parents and two BC_2F_7 lines from a local rice breeding program, with Malaysian rice variety, *Oryza sativa* ssp. *indica* cv. MR219 as recurrent parent, and *Oryza rufipogon* (IRGC105491) as donor parent. Approximately 2.8 kb and 2.6 kb putative *RPK1* cDNA nucleotide sequences were obtained from *Oryza rufipogon* and *Oryza sativa* ssp. *indica* cv. MR219 respectively. However, only 402 bp partial cDNA nucleotide sequence of putative *CLV1* were isolated from *Oryza rufipogon* and *Oryza sativa* ssp. *indica* cv. MR219. Both of the genes were identified and categorised into the transmembrane receptor kinase group, which represents the largest group of plant RLK/*Pelle* family. Real time quantitative reverse transcriptase Polymerase Chain Reaction (qRT-PCR) analysis indicated that putative *CLV1* was highly up-regulated during booting stage and heading stage; whereas, putative *RPK1* was up-regulated at booting stage. Based on Southern hybridization analysis, one to three copies of putative *RPK1* and three to five copies of putative *CLV1* are present in the genome of *Oryza rufipogon* and *Oryza sativa* ssp. *indica* cv. MR219. About one hundred base pair of putative *RPK1* gene sequence and putative *CLV1* gene sequence respectively were used to assemble plant RNA interference constructs. The RNAi vector containing sequences of putative *CLV1* was successfully introduced into *Oryza rufipogon*, IRGC105491 by *Agrobacterium*-mediated transformation.

ABSTRAK

Putatif "*Receptor-like Protein Kinase 1*" (putatif *RPK1*) dan putatif "*CLAVATA1 Receptor Kinase*" (putatif *CLV1*) dipilih untuk pengkajian tentang molekul dan ekspresi analisis. Ia dilaksanakan oleh empat jenis padi yang terdiri daripada dua induk dan dua jenis BC_2F_7 daripada program pembiakbakaan beras tempatan Malaysia, iaitu *Oryza sativa* ssp. *indica* kultivar MR219 sebagai penerima, dan *Oryza rufipogon* (IRGC105491) sebagai penderma. Kira-kira 2.8 kb dan 2.6 kb putatif *RPK1* urutan nukleotida cDNA diperolehi daripada *Oryza rufipogon* dan *Oryza sativa* ssp. indica. kultivar MR219 masing-masing. Namun, hanya 402 bp separa urutan nukleotida cDNA putatif *CLV1* diperolehi daripada *Oryza rufipogon* dan *Oryza sativa* ssp. *indica* kultivar MR219 masing-masing. Kedua-dua gen dikenalpasti dan dikategorikan ke dalam kumpulan reseptor kinase transmembran, yang merupakan kumpulan yang terbesar dalam keluarga tumbuhan RLK/*Pelle*. Analisis "real-time quantitative reverse transcriptase Polymerase Chain Reaction" (qRT-PCR) menunjukkan bahawa ekspresi putatif *CLV1* meningkat semasa tahap bunting dan tahap keluar malai, manakala ekspresi putatif *RPK1* meningkat dengan tinggi di tahap bunting. Dari analisis "Southern hybridization", *Oryza rufipogon* dan *Oryza sativa* ssp. *indica* kultivar MR219 mungkin mengandungi satu hingga tiga salinan putatif *RPK1* dan tiga hingga lima salinan putatif *CLV1* dalam genom. Seratus bp urutan nukleotida cDNA dari putatif *RPK1* dan putatif *CLV1* masing-masing telah digunakan dalam pembinaan RNAi konstruct. RNAi vektor yang mengandungi putatif *CLV1* urutan nukleotida telah berjaya transformasi ke dalam *Oryza rufipogon*.

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