

Transcriptome Sequencing, Assembly and Annotation of Aromatic Kon Joha Rice of Northeast India

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Abstract—Rice is the staple food of around 3 billion people, most of them in Asia which accounts for 90% of global rice consumption. Aroma is one of the most important characteristics of rice, especially when taking consumer acceptance as a criterion. The Northeast region represents culturally and ecologically unique landscape of India. Rice is the principle staple food crop of this region which occupies nearly 70% of the total cultivated land area. In this study we took Aromatic cultivar Kon Joha (KJ1 & KJ2) from the North Eastern state of Assam and Ranjit (RA1 & RA2) variety as a Non-aromatic control. We performed transcriptome sequencing of both the rices using Illumina NexSeq. The raw data generated were quality checked using FastQC with Phred Score >30 for all the raw reads. We assembled the raw reads using Trinity Assembler, where number of transcripts assembled was 53608, 57803, 75328 & 70110 in KJ1, KJ2, RA1 & RA2 respectively. Total number of assembled bases were 43727015, 45761890, 77826192 & 69411873 in KJ1, KJ2, RA1 & RA2 respectively. Assembly was followed by Differential Gene Expression analysis using EdgeR. The total of 1059 genes were differentially expressed in Aromatic rice where 928 were up-regulated and 131 were down-regulated. The differentially expressed genes were functionally annotated using Blast2Go and Mercator annotation tools. We analyzed all three GO terms- Molecular Function, Biological Process and Cellular Component. Enzyme Class and Kegg Pathway of the DEG were also analyzed. Functionally annotated genes relates to Biotic and Abiotic Stresses, Secondary metabolites, Signalling, Development, Hormone metabolism, Metal handling etc. These genes obtained through annotation might provide new insight into molecular breeding programs and then to improve the poor yield among these varieties. Altogether, this will aid future agronomic and functional genomics studies in aromatic rice cultivars of Northeast India.