

Comparative Transcriptome Profiling of Low Light Tolerant and Sensitive Rice Varieties Induced by Low Light Stress at Active Tillering Stage

Authors : Darshan Panda, Lambodar Behera, M. J. Baig, Sudhanshu Sekhar

Abstract : Low light intensity is a significant limitation for grain yield and quality in rice. However, yield is not significantly reduced in low-light tolerant rice varieties. The work, therefore, planned for comparative transcriptome profiling under low light stress to decipher the genes involved and molecular mechanism of low light tolerance in rice. At the active tillering stage, 50% low light exposure for one day, three days, and five days were given to Swarnaprabha (low light tolerant) and IR8 (low light sensitive) rice varieties. Illumina (HiSeq) platform was used for transcriptome sequencing. A total of 6,652 and 12,042 genes were differentially expressed due to low light intensity in Swarnaprabha and IR8, respectively, as compared to control. CAB, LRP, SBPase, MT15, TF PCL1, and Photosystem I & II complex related gene expressions were mostly increased in Swarnaprabha upon the longer duration of low light exposure, which was not found in IR8 as compared to control. Their expressions were validated by qRT-PCR. The overall study suggested that the maintenance of grain yield in the tolerant variety under low light might be the result of accelerated expression of the genes, which enable the plant to keep the photosynthetic processes moving at the same pace even under low light.

Keywords : rice, low light, photosynthesis, yield

Conference Title : ICPPWS 2021 : International Conference on Plant Pathology, Physiology, and Weed Science

Conference Location : Athens, Greece

Conference Dates : October 21-22, 2021