

Transcriptome Analysis of Pre-harvest Sprouting (PHS)-induced and abscisic acid (ABA)-treated Korean wheat (*Triticum aestivum*)

Jae Yoon Kim^{1*}, Chang-Ho Kim¹, Sang Yong Park¹, Kyeong Do Min¹, Yong Jin Lee², Yong Weon Seo²

¹Department of Plant Resources, College of Industrial Science, Kongju National University, Yesan 32439, Republic of Korea

²Department of Biotechnology, Korea University, Seoul 136-713, Republic of Korea

[Introduction]

Pre-harvest sprouting (PHS) is the precocious germination condition of grains while the spike is still in the mother plant. Because PHS in wheat drastically reduced the quality and economic value of wheat grain, the improving PHS wheat is one of the most important breeding goal in Korean wheat breeding program. In this study, we performed comparative expression analyses of genes related to phytohormone biosynthesis and signaling, especially ABA and GA, in two Korean wheat cultivars with different responses to PHS (tolerant/susceptible) using high-throughput RNA-seq technology.

[Materials and Methods]

Two Korean cultivars of common wheat, 'Keumgang' (Geuru/Kanto75//Eunpa, PHS sensitive, Korea RDA accession no. IT213100) and 'Woori' (Geuru/Ol, PHS resistant, Korea RDA accession no. IT175538) were used in this study.

[Results and Discussions]

A total of 123 unigenes were related to the biosynthesis or signaling of ABA, gibberellic acid, indole-3-acetic acid, and cytokinin, and 1862 of differentially expressed genes (DEGs) were identified and categorized into eight groups. The majority of DEGs were involved in sugar-related processes, which interacted with ABA signaling in PHS-induced grains of the PHS-tolerant cultivar. These findings indicate that ABA-related genes are key regulators of dormancy and germination in winter wheat and provide insight into PHS-induced changes in the expression of plant hormone-related genes.

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*Corresponding author: Tel. +82-41-330-1203, E-mail, jaeyoonkim@kongju.ac.kr