

PB-32

Development and Characterization of Pre-harvest Sprouting (PHS) Resistance Korean Wheat (*Triticum aestivum*)

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[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. Mother of FT and TFL1 (MFT) gene is known to be a very important gene for seed dormancy and has been shown to be highly expressed in mature wheat seeds placed in low temperature environment.

[Materials and Methods]

A total of 22 Korean cultivar of common wheat including ‘Keumgang’ (accession no. IT213100) and ‘Woori’ (accession no. IT175538) were used in this study. The germination experiment was conducted using the sandbury method of *Baier et al.* (1987). Phylogenetic analysis was performed for MFT gene using MEGA7 (<https://www.megasoftware.net/>) and created the neighbor-joining tree (NJ method). Quantitative real-time PCR was carried out with DAF (Day After Flowering) 35 wheat grain using Rotor-Gene Q (QIAGEN Hilden, Germany).

[Results and Discussion]

The highest germination rate (>70%) was observed in most cultivar. There is no significant difference in the dormancy breaking, germination among cultivar. However, PHS by mist analysis, which did not overcome the dormancy breaking, showed that there was a difference in germination among cultivar. We isolated MFT genes from 22 Korean wheat cultivar and identified a InDel sequence (TATG) in the exon region. After phylogenetic analysis, 22 Korean wheat cultivar were classified two groups according to possess of InDel sequence. In addition, quantitative RT-PCR was performed using Korean cultivar. As a result, it was confirmed that MFT transcript accumulation was high in the cultivar group which is expected to be resistant to PHS. Further experimental results will be discussed.

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