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## ***OsBHT*, a Novel Gene Identification Heat Tolerance Gene at Booting Stage in Rice**

Jae-Ryoung Park<sup>1</sup>, Kyung-Min Kim<sup>1\*</sup>

<sup>1</sup>Division of Plant Biosciences, School of Applied Biosciences, College of Agriculture and Life Science, Kyungpook National University, Daegu 41566, Korea

### **[Introduction]**

Recently, various damages to rice have occurred due to the occurrence of abnormal weather. In particular, heat stress due to global warming has a negative influence on the growth of plants. In particular, an increase in average temperature of 1°C is reported to reduce yield of rice by 10%. Rice is vulnerable to high temperatures in the reproductive stage. Recently, the frequency of abnormal weather is increasing. Therefore, in this research, we newly discovered *OsBHT*, a gene that exhibits high temperature tolerance in the booting stage, by QTL mapping, and analyzed the genetic function of *OsBHT*.

### **[Materials and Methods]**

In this study, we used the double haploid line (CNDH) cultivated by crossing Cheongcheong and Nagdong. The seeds were sown, and when they became booting stage, the plants were transferred to a growth chamber and subjected to high temperature stress. Then, we investigated the major agronomic characteristics of rice. Window QTL cartographer2.5 were used for the QTL analysis of genes related to the heat tolerance of booting stage in rice, and used LOD value of 2.5 or more by using the method of Composite Interval Mapping (CIM).

### **[Results and Discussion]**

The curves in the frequency table when investigating the major agronomic traits after high-temperature treatment of the CNDH 120 line showed a continuous change close to the normal distribution. When QTL mapping of all the investigated traits was performed, it was commonly searched in RM212-RM1297 of chromosome 1. In this region, cell function (37.5%), phytohormone (22.9%), plant defense (16.7%), signaling (8.3%), heat shock protein (8.3%), kinase (6.3%) candidate genes were detected. Of these, *OsBHT*, which is associated with heat shock protein, increased the gene expression level of only the heat tolerance line. *OsBHT* prevents unfolding and denaturation of cellular proteins. Therefore, it is expected, *OsBHT*, will be effectively utilized for the development of rice tolerance to high temperature.

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\*Corresponding author: Tel. +82-53-950-5711, E-mail. kkm@knu.ac.kr