

PB-28

Transcriptomic Interaction Analysis Between Green Rice Leafhopper (GRH) and GRH Resistance NIL Rice

Youngho Kwon^{1*}, Sumin Jo¹, Ji-Yoon Lee¹, Jun-Hyeon Jo¹, Sais-Beul Lee¹, Taehun Kim¹, Joowon Kang¹, Jongmin Ko, Jong-Hee Lee¹, Dong-Soo park¹

¹Department of southern area crop science, Paddy crop research division, NICS, RDA

[Introduction]

The green rice leafhopper (GRH) is one of the most important pest in East Asia. GRH causes enormous yield loss by damaging rice and mediating rice dwarf virus (RDV). GRH sucks rice vascular while it secretes watery saliva containing a number of bioactive proteins including laccase and beta-glucosidase. It withers rice by sucking host. Therefore it is necessary that breeding GRH resistant rice. Until now 7 genes have been identified to resist against GRH, such as *Grh1*, *Grh2*, *Grh3*, *Grh4*, *Grh5*, *Grh6*, *Grh9*.

[Materials and Methods]

In this study, we performed transcriptome analysis of GRH and GRH resistant NIL rice which has *Grh1* from cultivar Shingwang. When GRHs had sucked NIL, it died in 60hrs. So GRH, NIL and recurrent parent cultivar Ilpum (without *Grh1*) were RNA sequenced after 60hrs of feeding.

[Results and discussion]

Conspicuously up-regulated processes were metabolic pathway and biosynthesis of secondary metabolite on comparing with NIL and Ilpum. Also plant hormone signal transduction, plant-pathogen interaction, MAPK signaling pathway were up-regulated on NIL. According to gene ontology (GO) annotation system, cofactor metabolic process and macromolecule catabolic process were significantly up-regulated. On GRH transcriptome analysis, signaling pathways to response invasion and detoxification of external toxin substances were up-regulated compared with GRH which sucked NIL and Ilpum. However transcription, translation, several defense systems to external stimulus, protease and pro-resilin conferring elasticity to active organs were down-regulated on NIL fed GRH. As a result, NIL rice that has *Grh1* make anti-insect secondary metabolites and these are carried in vascular tissues. We assume that NIL sucked GRH could be died because of immotility and anti-insect substances. This result provides useful information on transcriptomic regulation of resistance mechanisms.

[Acknowledgement]

This research was supported by PJ014279022019 in RDA, Korea

*Corresponding author: Tel. +08-55-350-1162, E-mail. kwon6344@korea.kr