Yong Hoon Lee et al., J Plant Pathol Microbiol 2017, 8:5 (Suppl)
DOI: 10.4172/2157-7471-C1-006

Differences of genomic and phenomic responses in resistant and susceptible rice varieties to bacterial leaf blight

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Bacterial leaf blight (BLB) causes severe yield losses in temperate and tropical rice-growing regions. To reduce the occurrence of BLB, disease resistant rice cultivars are developed by introducing resistant genes. In this study, near-isogenic rice genotypes, *IRBB21*and *IR24*, which are resistant and susceptible to BLB, respectively were challenge inoculated with *Xanthomonas oryzae* pv. *oryzae (Xoo)* races, K1, K2, and K3 by scissor clip method. *IR24* was susceptible to all the inoculated *Xoo* races (S interaction), but IRBB21was highly resistant to K2 and K3 (R interaction), and moderately resistant to K1 race (MR interaction). The influence on photosynthesis in the various combinations was measured using Chlorophyll Fluorometer. The Fv/Fm was significantly decreased in leaves of S and MR interaction. However, there was no drastic fluctuation in the leaves of R interaction. The effective PSII quantum yield (ΦPSII) value decreased severely in S interaction, but slightly in R interaction at 2 days after inoculation (dai) before symptoms were developed. ΦPSII value in S interaction significantly decreased till 7 dai, while an increase was observed in R interaction. To better understand the difference in response of R and S interactions, we investigated the expression levels of defense-related genes. The expression of *OsPR1a, OsPR1b* and *OsPR10a* significantly increased in S interaction at 2 dai and then downregulated at 5 dai. The expression of the genes in R interaction increased significantly from 2 to 5 dai. Furthermore, we obtained hyperspectral images from the *Xoo* inoculated rice leaves and analyzed by principal component analysis. The difference in the images between resistant and susceptible variety was observed from 2 dai, which would help us to screen resistant crops in early stage of infection. The underlying proteomic and metabolomic differences need to be further explored.

Biography

Yong Hoon Lee worked as a Research Scientist at Rural Development Administration (RDA) of Republic of Korea. During his stay in RDA, he studied for management of plant disease especially by focusing on biological control. In 2009, he moved to Chonbuk National University and his lab studies focused on the interaction between plants and pathogen (*P. cichorii*), interaction between plants and rhizosphere microbiome (PGPR), and interaction between plants and environment (light) by focusing on genomic and physiological responses between the factors.

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