



Tropentag, September 18-20, 2019, Kassel

“Filling gaps and removing traps
for sustainable resource management”

Large Scale Screening for Potential Abiotic Stresses Tolerant Rice Germplasm in Vietnam

TRUNG DUC TRAN, LINH HONG TA, DANG QUANG BUI

Vietnam Academy of Agricultural Sciences, Science and International Cooperation, Vietnam

Abstract

Global climate change has potentially grave affects for rice production and, consequently, global food security. Its phenomena, such as sea-level rise leading to salinity intrusion, temperature increment and unpredicted weather causing flooding and drought, occur more frequently in the irrigated intensively managed rice areas and is accounted for a 15% decrease in rice yields worldwide. Rice production of Vietnam recently has been under the influence of the same circumstance. In order to mitigate and adapt to increasing severe unfavoured conditions, breeding for new rice varieties which effectively tolerant to abiotic stresses such as submergence, salinity and drought is a priority in the restructuring strategy of Vietnam agriculture sector.

Vietnam is one of the world's genetic diversity centres of rice. Sufficient rice germplasm evaluation is considered as a crucial premise which, therefrom, facilitates effective exploitation of such gene pool for rice breeding programme in the themes of food security guarantee and climate change mitigation.

In this presented study, a panel of 146 Vietnam rice accessions that included landraces, elite and popular cultivars, and breeding lines developed from various rice breeding programme across Vietnam were screened both phenotypically and genetically. Phenotypic evaluation under unfavourable abiotic stresses identified five accessions highly tolerant to submergence, one accession moderately tolerant to 9‰ salinity and 16 accessions exhibiting potential yield performance under drought stress. In parallel, genotyping experiment using the 7K SNP Chip revealed a high diversity among screened rice accessions. Genotypes which associate with characterised genes/QTLs conferring targeted abiotic stresses tolerance were observed for most of potential rice accessions except that showing tolerance to salinity. It implies that, there are other genetic elements may involving in salinity tolerance in rice. Notably, clustering analysis based on the selected 52 SNP markers representing submergence, salinity and drought tolerance genes/QTLs also discriminated groups of landraces and improved accessions. These results provided a useful insight into the genetic diversity of Vietnam rice population.

Keywords: Drought, rice, salinity, screening, SNP, submergence