

Plant Genomics

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QTL identification for reproductive-stage salinity tolerance in rice using novel phenotyping technique

Rakesh K Singh¹, Mostafa Ahmadizadeh^{1,2} and Naireen A Vispo¹¹International Rice Research Institute, Philippines²Sari Agricultural Sciences and Natural Resources University, Iran

Rice responds differentially at different stages of development. The seedling and reproductive stages are the most sensitive growth stages with very weak association, suggesting that they are regulated by different processes and sets of genes/QTLs. There are hardly any studies exist on reproductive-stage salinity tolerance mainly because of the lack of reliable reproductive-stage-specific phenotyping techniques and incomplete knowledge of the stage-specific mechanisms of salinity tolerance. Two major challenges for screening exclusively for the reproductive stage are; how to stress plants at the reproductive stage without stressing them at the seedling or late vegetative stage; and how to impose the stress on different genotypes or mapping populations at equivalent growth stages of development because of the variability in the progression of growth rate through developmental stages. We standardize a methodology that allows salt translocation to the reproductive organs such as the flag leaf (the largest source for the sink) and panicle as quickly as possible just at the initiation of booting when the genotypes are at the same stage of tissue/organ development rather depending on age of the plant. A mapping population derived from CSR28/Sadri was used QTL identification using the novel phenotyping technique and 6K illumina SNP platform. Salt stress equivalent to EC 10 dSm-1 was imposed on rice plants with trimmed leaves starting from boot leaf emergence up to 20 days in an experiment. Stage-specific effect of salt stress was verified by observing salt-sensitive and salt-tolerant genotypes. Details will be presented.

Biography

Rakesh K Singh is a Rice Breeder in Plant Breeding Division at IRRI, Philippines. His expertise is on breeding rice varieties for abiotic stress tolerance with special reference to salt-affected soils (saline and alkaline soils), as well as zinc deficient and iron toxic soils. He has completed his MSc and PhD degree from GB Pant University of Agriculture and Technology, Pantnagar, India and started his research career in 1986 as a Scientist at Central Soil Salinity Research Institute (Indian Council of Agricultural Research), Karnal (India), where he strengthened the rice breeding program for salt-affected areas. He has moved to IRRI Philippines in 2005 and led the salinity breeding group to developed salinity tolerant and first time multiple stress tolerant (salinity+submergence tolerant) rice genotypes at IRRI using molecular marker technology that are released and/or under advance stage of testing for release in various south and SE Asian countries. He has published more than 75 papers in peer reviewed journals and guided many MS and PhD students from India, Philippines, Myanmar, Iran, Burundi, Madagascar and Egypt. He is also serving as an Adjunct Associate Professor of Plant Breeding and Genetics at the University of the Philippines at Los Baños, Philippines.

r.k.singh@irri.org

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