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Salt Tolerance in Glaberrima rice: Mechanism and approach using micro-proton induced x- ray emission techniques

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Salt tolerance is an important constrain for Africa rice. Soil salinity is one of the major constraints affecting rice production worldwide, especially in the northern part of Senegal. Susceptibility or tolerance of rice plants to high salinity is a coordinated action of multiple stress responsive genes, which also interacts with other components of stress signal transduction pathways. Salt tolerant varieties can be produced by using two different sets of germplasm. One comprised of a diversity panel of 317 accessions of O. Glaberrima received from Africa Rice Genetic Resources Unit and checks: FL478 (salt tolerance), IR 29 (salt sensitive), Sahel 210 and Sahel 134. The second is comprised of an indica diversity panel of 330 genotypes received from IRRI. Both sets were evaluated under control conditions where they were grown under irrigated lowland conditions using non-saline river water (EC <1 dSm-1) and also under saline conditions in a concrete-lined field where salinity was maintained at 4 dSm-1. In this review, we have updated on mechanisms and genes which can help in transferring of the salt tolerance into high-yielding rice varieties. We have focused on the need for integrating plant biology into transgenic and breeding approaches to develop high-yielding as well as salt tolerant rice varieties. PIXE studies have been performed for determination of different elements in rice plants. The micro beam analytical technique existent at the iThemba LABS was applied for the 2D image mapping of fresh rice tissues. The technique will be used to measure the concentration of low atomic mass elements based on the targeted it in the rice plants with detection limits of typically 1-10µg/g.

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