[O33] Salinity

Chair: Yoshihiko Hirai (Okayama University, Japan)
Chair: Sakae Agarie (Kyushu University, Japan)
Chair: Glenn Borja Gregorio (Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), Phillippines)
2021年9月9日(木) 17:00 ～ 19:00 Room 3 (Oral) (Abiotic Stress for Crop Production)

17:20 ～ 17:40

[O33-02]Mechanism of Salt Removal Ability in Leaf Sheath of Rice and its Potential for Molecular Breeding

(Invited Speaker)
○Shiro Mitsuya[1], Sarin Neang[1], Nicola S. Skoulding[2], Joyce A. Cartagena[1], Mana Kano-Nakata[3], Akira Yamauchi[1] (1.Graduate School of Biological Sciences, Nagoya University, Japan, 2.Graduate School of Science, Nagoya University, Japan, 3.International Center for Research and Education in Agriculture, Nagoya University, Japan)

Rice is sensitive to high salinity and the presence of salt in the soil decreases growth and productivity. At the seedling stage, maintaining low sodium and chloride concentrations in leaf blade is a key trait in determining the growth of rice. Rice has the ability to salt remove salt in the leaf sheath and our group has focused on the physiological and molecular mechanisms. We found that, in the rice leaf sheath, excess amounts of sodium and chloride ions are unloaded from xylem vessels, preferentially transported from vasculature to the central part, then accumulated in the fundamental parenchyma cells. Furthermore, sodium and chloride ions are removed in different parts of the leaf sheath along the longitudinal axis; basal for sodium and tip parts for chloride. A comprehensive transcription analysis using RNA seq revealed the involvement of fundamental parenchyma cells at the center of the leaf sheath, in over-accumulation of salt under salinity. There was a wide variation of sodium removal ability in the leaf sheath among the 296 rice varieties, which positively correlated with salt tolerance. GWAS revealed significantly associated SNPs for sodium removal ability in leaf sheath on chromosome 5, which will facilitate the dissection of the molecular mechanism and further molecular breeding of salt tolerant rice varieties. In contrast, there was a small variation regarding chloride removal ability in leaf sheath but it did not have a significant association with salt tolerance.