PhD Dissertation Defense Presentation/Science Seminar

Molecular Physiological Study of Saline-Alkaline Stress Tolerance in Rice

(イネの塩アルカリストレス耐性に関する分子生理学的研究)

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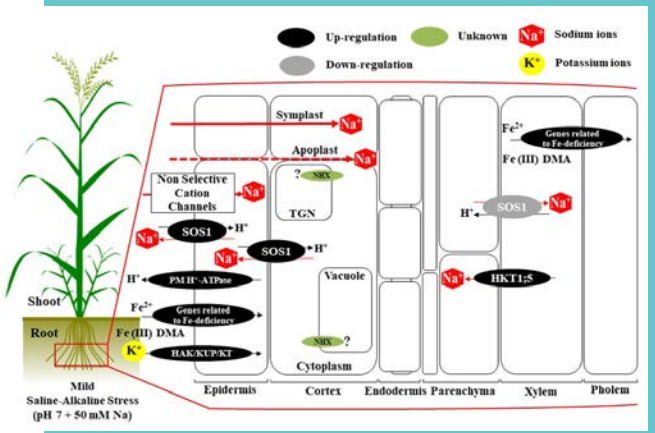

Soil salinization/alkalinization is a global problem in crop cultivation and has complex effects on plant metabolism. The combinations of high Na^+ and high pH stresses in saline-alkaline soils have more severe effects on plant growth and development than high Na^+ stress in saline soils. However, both physiological and molecular mechanisms behind saline-alkaline tolerance in plants have not been fully elucidated. Rice is classified as a glycophyte which is relatively sensitive to salinity stress. In past decades, a few rice genotypes have been analyzed for their combined saline and alkaline responses. Thus, the present study was conducted to investigate the molecular physiological responses of two well-known rice genotypes (FL478; salt-tolerant genotype, and IR29; salt-sensitive rice genotype) to different pH of saline-alkaline stress conditions. In order to produce new saline-alkaline tolerant rice genotypes in the future, 93 rice genotypes were screened and accessed their tolerance to saline-alkaline stress. The results obtained from all experimental screenings have been confirmed that Fukoku is relatively saline-alkaline tolerant compared to other rice genotypes. Both studies demonstrated that the mechanisms of saline-alkaline tolerance in either FL478 or Fukoku rice genotypes are related to the function of genes encoding Na^+ transport proteins and genes for Fe acquisition proteins.

29 January, 2021,
13:00~14:00
Room C206,
School of Applied Biological Science

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