[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)
Thu. Sep 9, 2021 5:00 PM - 7:00 PM Room 3 (Oral) (Abiotic Stress for Crop Production)

5:55 PM - 6:10 PM

[O33-04]Rice Memorizes Salinity Stress by Training and Improves the Salinity Stress Response and Yield

*Nominated for Presentation Awards

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Training is a technique to apply abiotic stress in advance such as salinity to plants. It enables plants to memorize the stress and change the molecular and physiological responses, e.g. the expression of stress-responsive genes, to future stresses. Therefore, we determined whether salinity training improves the growth and yield of rice grown under long-term salt stress conditions. Also, we investigated the change in the salinity stress response at the transcriptome level.
A rice variety Nipponbare was hydroponically grown for 90 days including 4-day germination. In the germination, training plants (T) were treated with 125 mM NaCl and non-training plants (NT) were treated with distilled water. The salinity stress was applied by adding 50 mM NaCl to the hydroponic solution from 18 to 90 day. On days 18, 19, and 47, total RNA was extracted from the leaf blades and used for RNA-seq analysis.
The yield of the T was significantly increased by 1.45-fold compared with that of NT under salinity condition. However, there was no significant difference in yield under control conditions, suggesting that training improved salinity tolerance with no yield penalty under control. On day 18, just before the start of the salinity stress treatment, the expression levels of H1 genes were significantly lower in T. Although there were 1971 salinity response genes on day 19, 830 genes responded to salinity stress only in T. This suggests that H1s, linker histones which recruit DNA methyltransferase, may have retained stress memory and altered the response of other genes to subsequent salinity.