

[O32] Drought Physiology

Chair: Junichi Kashiwagi (Hokkaido University, Japan)

Thu. Sep 9, 2021 2:30 PM - 4:30 PM Room 3 (Oral) (Abiotic Stress for Crop Production)

3:40 PM - 3:55 PM

[O32-05] Optimizing Intermittent Irrigation Methods That Maximize Rice Productivity While Saving Irrigation Amount by Promoting Root Developmental Plasticity with Adequate Level of Nitrogen

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The intermittent irrigation method is effective for achieving both water saving and yield improvement. However delay in irrigation may cause serious drought and reduce the yield. Omi et al. (2018) and Kameoka et al. (2019) reported optimal irrigation timing for several rice varieties with different soil fertility conditions. In this study, the effects of nitrogen fertilization on the plasticity of rice root system development under intermittent irrigation conditions were examined. Nipponbare, Swarna and KDML105 were grown in pots with 4 irrigation schedules; daily, and intermittent irrigation when the soil water potential at 12.5 cm soil depth reached either -20, -40 and -70 kPa. Experiments were conducted in RCBD with 3 replications with two fertilizer treatments, a small fertilizer plot (Kameoka et al., 2019) and a standard fertilizer plot (Tran et al., 2014) under a rainout shelter in 2019. Irrigation treatment was applied from root-taking period to just before panicle initiation stage. KDML105 in standard fertilizer plot with irrigated treatment at -20 kPa showed the most plasticity of rice root development. Regardless of the amount of fertilization, plasticity was exhibited only in the nodal root elongation ability under intermittent irrigation conditions, and the degree of plasticity became more prominent with an increase of nitrogen fertilization. This study suggests that more effective intermittent irrigation can be achieved by using the optimal amount of fertilizer to exert the plasticity of root system development.