[O34] O_2 Deficiency, Submergence

Chair: Mikio Nakazono (Nagoya University, Japan)
Chair: Feng Yu (Hubei University, China)
Fri. Sep 10, 2021 9:45 AM - 11:45 AM Room 3 (Oral) (Abiotic Stress for Crop Production)

10:05 AM - 10:25 AM

[O34-02]Adaptive Root Traits for Internal Aeration of Crops under Waterlogged Soil Conditions

(Invited Speaker)

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Flooded (waterlogged) soil conditions negatively affect growth and survival of most plants in agricultural and natural ecosystems; the exceptions being rice and other wetland species that are well adapted to these conditions. To acclimate to soil waterlogging, roots of some plants form aerenchyma. Aerenchyma enables internal aeration between shoots and roots, and its formation is therefore important for the adaptation of plants to excess water environments. Lysigenous aerenchyma forms in roots as a result of the death and subsequent lysis of cortical cells. In roots of some waterlogging-tolerant plants such as rice and *Zea nicaraguensis* (a wild relative of maize), lysigenous aerenchyma is constitutively formed even under aerobic conditions, and its formation is induced under oxygen-deficient conditions. The former and latter are respectively designated as "constitutive" and "inducible" aerenchyma formations. Recently, we identified some key factors regulating constitutive or inducible aerenchyma formation in rice roots. In addition to the aerenchyma, in rice, *Z. nicaraguensis* and some other wetland species, a barrier to radial oxygen loss (ROL) that greatly reduces oxygen leakage from basal parts enhances the oxygen diffusion to the apex. We are now conducting genetic and physiological analyses to identify a gene controlling ROL barrier formation in *Z. nicaraguensis*. In this session, we present the recent advances we have made in understanding the mechanisms of formation of the aerenchyma and the induction of a barrier to ROL in roots.