

[P3] Abiotic Stress for Crop Production

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 3 (Poster) (Abiotic Stress for Crop Production)

1:15 PM - 2:00 PM

[P3-32] Transitional Oxygen Point (TOP), a Physiological Indicator to Evaluate Waterlogging Tolerance in Crops

*Nominated for Presentation Awards

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Soil waterlogging causes poor growth and yield loss of various crops. Under waterlogging soil, plant root respiration is inhibited with hypoxia. The hypoxia is led with excess water inhibiting ventilation and with organic aerobic respirations. Although evaluation of waterlogging tolerance is important to improve crop yields, few efficient physiological indicators have been proposed for interspecific and varietal comparisons of the waterlogging tolerance. In this study, we attempted to establish a useful physiological indicator of the intensity of waterlogging tolerance in some poaceaeous crops. We measured the respiration rate and retainability in seminal and crown roots of rice, maize, wheat and teosinte. Based on a predicted O₂ dependence relationship model and our data, we newly established a method calculating Transitional Oxygen Point (TOP). The TOP is defined as the inflection point between the semi-linear and curvilinear phases in the model. The TOPs in seminal and crown roots were relatively low in rice, which possesses high waterlogging tolerance. In contrast, the TOPs were relatively high in crops with low waterlogging tolerance such as maize and wheat. We propose that the TOP is a useful indicator of waterlogging tolerance of crops, and the respiration rate/retainability at the TOP becomes a novel index for the evaluation of waterlogging tolerant intensity in crops.