POSTER 05

광화학반사지수를 이용한 고온 조건에서 생육된 보리의 생육·생리 반응 평가

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Evaluation of Physiological Response of Barley to High temperature Condition using Photochemical Reflectance Index

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Technique to rapidly detect crop stress is required for agricultural sustainability under climate change conditions. PRI (Photochemical Reflectance Index) is a useful index to identify plant stresses of soil moisture, photo-inhibition, aging, ozone etc. However, the response of PRI to high temperature condition has not been reported yet. We continuously monitored the temporal change of the PRI during the barley growth period, 2016 winter to 2017 spring, in the warmer condition (AT+3°C) of the TGFC (Temperature Gradient Field Chamber) which was designed to keep 3°C higher than the ambient temperature (AT). First, to qualitatively understand the PRI value in different air-temperature, the PRI were compared with Fv/Fm (Maximum quantum yield). Then, we found that the linear positive correlation were appeared between both indices. Second, the different temperature-dependent patterns were appeared by the time series analysis. After seeding, the PRI in both temperature conditions were increased with similar rate, but the PRI at AT+3°C was much higher than AT. In most cold season, the decreases in PRI at both conditions were much larger at AT+3°C. In early spring season, the both values of PRI became to increase. Then, after heading, the PRI at AT+3°C was changed to decrease. However, the PRI at AT was lately dropped due to relatively slower heading. Third, according to the analysis of the PRI to irradiance, the sensitivity to photo-inhibition stress was higher at PRI leaves at AT+3°C than at AT. Our results will be useful to understand the physiological response of crop to global warming.

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POSTER 05

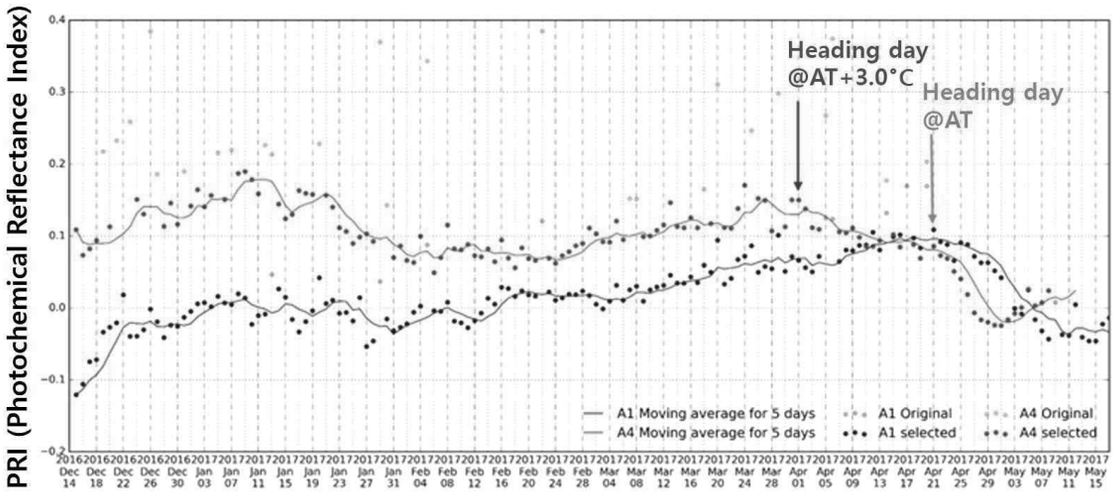

Fig. 1. Temporal trends of PRI during the barley growth period (2016 winter to 2017 spring) at two different air-temperature conditions.