ONLINE ISSN : 1349-1008
PRINT ISSN : 1343-943X

Plant Production Science
Vol. 12 (2009) , No. 1 50-53

[PDF (506K)] [References]

Correlation of Chlorophyll Meter Readings with Gas exchange and Chlorophyll Fluorescence in Flag Leaves of Rice (*Oryza sativa* L.) Plants

Etsushi Kumagai[1)], Takuya Araki[2)] and Fumitake Kubota[2)]

1) Graduate School of Bioresource and Bioenvironmental Sciences, Kyushu University
2) Faculty of Agriculture, Kyushu University

(Received: March 21, 2008)

Abstract: The objective of this study was to establish the correlation of the chlorophyll meter (SPAD) readings with the contents of chlorophyll (Chl) and ribulose-1,5-bisphosphate carboxylase/oxygenase (Rubisco), the gross photosynthetic rate (P_G), and the maximum quantum yield of photosystem II (PSII) (F_v/F_m) in flag leaves of rice (*Oryza sativa* L.) in ripening stage. The SPAD readings significantly correlated with the Chl content, the Rubisco content, P_G and F_v/F_m (R^2=0.848, 0.648, 0.671 and 0.712, respectively), which suggests that the SPAD meter has the potential to estimate the photosynthetic capacity of the flag leaves. However, both P_G and F_v/F_m had a stronger relationship with the Rubisco content than the SPAD readings, indicating that the PSII photochemical and CO_2 assimilation capacities are strongly influenced by the Rubisco content. Therefore, accurate calibration would be indispensable to obtain the physiological information from the SPAD readings of flag leaves.

Keywords: Chlorophyll fluorescence, Chlorophyll meter, Flag leaf, Photosynthesis, Rice, Rubisco

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To cite this article:
Etsushi Kumagai, Takuya Araki and Fumitake Kubota: “Correlation of Chlorophyll Meter Readings with Gas exchange and Chlorophyll Fluorescence in Flag Leaves of Rice (*Oryza sativa* L.) Plants”. Plant Production Science, Vol. **12**, pp.50-53 (2009) .

doi:10.1626/pps.12.50
JOI JST.JSTAGE/pps/12.50