

[P2] Farming System

2021年9月9日(木) 12:15 ~ 14:00 Room 2 (Poster) (Farming System)

12:15 ~ 13:00

[P2-29]Effect of Environmental Differences on Empirical Regression Models for Estimating Leaf Area Index Using Vegetation Indices in Rice

*Nominated for Presentation Awards

○Tomoaki Yamaguchi¹, Daniel Menge², Emily Gichuhi², Peprah Clement Oppong¹, Megumi Yamashita¹, Daigo Makihara³, Keisuke Katsura¹ (1.Graduate School of Agriculture, Tokyo University of Agriculture and Technology, Japan, 2., Kenya Agricultural and Livestock Research Organization, Kenya, 3.International Center for Research and Education in Agriculture, Nagoya University, Japan)

Leaf area index (LAI) is an important parameter for monitoring rice growth, and various empirical models to predict LAI using vegetation indices (VIs) have been proposed. Most of the models, however, were developed based on data collected from a single location, which makes it difficult to apply these models to other environmental conditions. The objective of this study was to compare two empirical models for predicting LAI using VIs that were developed using data from Japan and Kenya with Basmati 370 as a common rice variety, and to reveal the physiological factors causing differences between the models. Spectral reflectance of rice canopies was measured using a hyper-spectral sensor just before destructive measurement of LAI at 2-week intervals from transplanting to heading. Simple ratio (SR) was one of the best VIs to predict LAI in a linear regression model. However, there was a significant difference in the slope coefficients of the regression curves of the developed models for the two locations. As the SR increased, the change in LAI was more pronounced in Japan than in Kenya, which means the rice plants in Kenya could develop leaf area efficiently with less mutual shading. In Kenya, plant length increased at a slower rate than in Japan probably because of lower temperature, hence plants were able to distribute smaller and more erect leaves. In order to develop a universal model to predict rice growth using VIs, further understanding of the interaction effects between genotypic and environmental factors on rice morphology is necessary.