[P1] Field Crop Production

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 1 (Poster) (Field Crop Production)

1:15 PM - 2:00 PM

[P1-14]Combined UAV and Phenotyping Data to Optimize the Growing Status and Management System on Rice Variety, TN11 and NCYU-TN2 in Taiwan

○Yu-Chien Tseng[1], Chun-Yi Wu[1], Wen Lii Huang[1], Wei-Jun Huang[2], Rong-Kuen Chen[3] (1.Agronomy Department, National Chiayi University, Taiwan, 2.Biomechatronic Engineering Department, National Chiayi University, Taiwan, 3.Chiayi Branch Station, Tainan District Agricultural Research and Extension Station, Taiwan)

Rice (*Oryza sativa* L.) is one of the most important crop in the world. Climate changes increase the risk of rice production and decrease the yield. Also, the population aging problem in agriculture makes it difficult to have enough labor resources. The goal of the study is to combine UAV (unmanned aerial vehicle) data with phenotyping data in the field. By analyzing both data, to build a decision system and help researchers/farmers manage the production system in time and at early stage. On this study, rice cultivar TN11 and NCYU-TN2 were utilized. TN11 is the most popular cultivar in Taiwan and has the largest planted acreage. NCYU-TN2 is the drought tolerance cultivar derived from a population of *japonica* rice and Taiwanese rice landrace. The experiment included four nitrogen treatment (70, 140, 210, 280 ton/ha). UAV with multi spectrum camera was implemented four times during the season (initial stage, tiller develop stage, grain-fill stage and prior to harvest). The phenotype investigation was conducted in the field at the same time. The UAV results were analyzed using Pix4D software and three values were mainly used, including NDVI (Normalized Difference Vegetation Index), NBI (Nitrogen Balance Index) and NDRE (Normalized Difference Red Edge Index). The results showed the nitrogen amount had positive correlation with plant height and NCYU-TN2 was taller than TN11, however, TN11 had more tiller numbers than NCYU-TN2. The tiller develop stage had the largest SPAD value on both cultivars. The regression analysis was conducted between yield/NDVI, yield/NBI, and yield/NDRE on different stages and both cultivars. NDVI and NDRE have better fitness than NBI on both cultivars. NCYU-TN2 showed R^2 =0.70 (r=0.84) between NDRE and yield on grain-fill stage.