Entry No. IRRC-0105

Category	: International Rice Research Conference
Select Theme	: Disruptive technologies and innovations
Endorsement email	:
Keyword 1	: Phenomics
Keyword 2	: Robotics and drones
Keyword 3	: Imaging
Title of Entry	: Drone based phenotyping of target traits
Presenting author	: Stephen Klassen
Presenting author email	: s.klassen@irri.org
Co author 1	: RK Sing, ML Jubay
Co author 2	: H. Zaw, M Baroaidan, H. Leung
Affiliation presenting author	: Strategic Innovation, International Rice Research Institute
Affiliation 1	: Plant Breeding, International Rice Research Institute
Affiliation 2	: Strategic Innovation, International Rice Research Institute
Select only one type of presentation	: 15 minute oral presentation

Abstract : Drone based high throughput phenotyping (HTP) represents a new technology that uses aerial imagery to characterize rice plants in an efficient, reliable and accurate method. This emerging technology has the potential to accelerate the discovery of novel alleles and agronomic traits for plant breeding. At IRRI, we have tested and optimized the use of drones using a suite of cameras for capturing color, multispectral and thermal imagery, for measuring and predicting phenotypic traits of rice in the field. A processing pipeline was developed for converting the imagery into spatially corrected image mosaics and extracting plot level data for trait analysis and GWAS. Results from the evaluation of large Multi-parent Advanced Generation InterCross (MAGIC) populations indicate consistent and accurate measurements of several targeted traits including plant height, days to flowering, percent canopy cover, biomass, and degree of lodging. QTL mapping of manually collected and correlated HTP traits were also consistent for flowering time, plant height, lodging, and yield. In summary, HTP trait correlation and QTL analysis was validated for MAGIC populations over several seasons. The ease and non-destructive nature of drone phenotyping provides a unique method to monitor dynamic plant growth and development for evaluation of GxExM and responses to biotic and abiotic stress. Next steps include further development of analysis methodologies for time series data, the development of a drone data management system, and scaling out to partner sites in the Philippines, India, and Taiwan.

Read more»

Uploaded Files »

No files found.