Entry No. IRRC-0103

Category	: International Rice Research Conference
Select Theme	: Systems physiology
Keyword 1	: Root biology
Endorsement email	:
Keyword 2	: Phenomics
Keyword 3	: Drought tolerance
Title of Entry	: OpenSimRoot-Rice: a functional-structural model of rice root system architecture and soil resource capture.
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Developing rice cultivars with the ability to grow in low-quality soil with limited resources is vital for achieving global food security. The case for optimising root system architecture (RSA) for improved soil resource acquisition in plants is widely recognised. RSA is a function of multiple traits. Evaluating the optimal combination of root traits offering appropriate RSA under varied environmental conditions exceeds the capacity of empirical research. Hence, we have adopted an integrated approach, wherein field research is complemented with functional-structural modelling in OpenSimRoot. The open source SimRoot modelling framework is renowned for simulating the interaction and spatiotemporal dynamics of root phenotypes and soil resources. The developed OpenSimRoot-Rice model, predicts how specific root traits, individually and in combination, affect soil exploration and the capture of soil resources. Furthermore, the impact of these root traits is assessed, by exploring the multi-dimensional parameter space of the model, to predict root ideotypes improving resource acquisition. These root ideotypes identified in silico will contribute to rice breeding programs leading to the development of high-yielding resource-efficient cultivars.

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