Entry No. IRRC-0623

Category	: International Rice Research Conference
Select Theme	: Systems physiology
Keyword 1	: Root biology
Endorsement email	:
Keyword 2	: Drought tolerance
Keyword 3	: Nutrients (such as mineral uptake, translocation, and regulation)
Title of Entry	: 'Root Ideotype' for sustainable rice production in Thailand
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Select only one type of presentation	: 3-5 minute flash talk
Abstract	: Rice is the most important cereal crop of the developing world and a staple food source of more than half of the world's population, providing 20-70% of total daily caloric intake. It is cultivated under a wide range of environmental conditions in terms of climate, water regime, soil type, and topography. Rainfed lowland rice is the dominant rice production system in NE Thailand, where its production is limited by multiple abiotic stresses, uncertain moisture supply and decreasing soil fertility. Drought and low phosphorus availability, frequently co-occurring throughout the tropics, are major constraints limiting rice production in rainfed lowlands. Roots, the hidden half of a plant, are of primary importance for numerous functions including absorption and translocation of water and nutrients and structural support. Roots have long been proposed as a major avenue of research to improve drought tolerance and phosphorus acquisition in rice. Significant efforts are now focusing on improving water and phosphorus acquisition efficiency through 'root breeding'. The aim of this study was to examine natural phenotypic variation of root traits relevant to water and phosphorus acquisition efficiency, and to assess effect of low phosphorus availability on root anatomical and architectural traits among landrace and modern Thai rice varieties. Our results illustrated that rice exhibits substantial genetic variation in root anatomical and architectural characteristics. Low phosphorus availability significantly increased root hair length and root cortical aerenchyma, but reduced small and large lateral root branching in all varieties. The present study provides the basis of further understanding of various root traits that might contribute to higher phosphorus and/or water acquisition efficiency of rice and would improve the sustainability, profitability, and climate resilience of Thailand's agriculture. Read Less»

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