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“Root-symbiont interaction dynamics in alternating wet and dry soil”

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Many plants can establish symbiotic interactions with arbuscular mycorrhizal (AM) fungi that colonize root cortical cells forming a branched hyphal structure that allows the exchange of soil-derived minerals from the microbe for fixed carbon in the form of sugars and lipids from the plant. The soil AM hyphal network can deliver Pi and other minerals to roots from locations well beyond the rhizosphere. Plant-fungal symbiosis has also been associated with resilience to environmental stressors, including drought. Yet this interaction has not been carefully examined at the molecular level and field studies on dry-land sorghum suggest that AM symbiosis is inhibited as soil moisture declines. We are interested in whether the intricate symbiosis between rice and AM is influenced by mild drought and re-irrigation, given the shift to alternating wet and dry irrigation of rice. By evaluating the cell biology and co-regulation of genes in fungus and plant, we uncover a coordinated disruption of inter-organismal interactions under transient stress. The results highlight both plasticity and fragility of symbiosis.

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