Entry No. IRRC-0043

Category	: International Rice Research Conference
Select Theme	: Sustainable and equitable farming systems
Endorsement email	:
Keyword 1	: Pest management
Keyword 2	: Ecological approaches
Keyword 3	: Sustainable management practices
Title of Entry	: Mycorrhizal colonization affects rice gene expression of resistance traits in response to herbivore feeding
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Arbuscular mycorrhizal fungi (AMF) are one example of beneficial soil microbes that play a vital role in mediating plant resistance against insect herbivores. Rice (Oryza sativa) also establishes roo associations with AMF. However, little is known about the underlying molecular mechanisms of these interactions. We studied how AMF colonization leads to changes in rice gene expression, up-regulating/down-regulating resistance-related genes, thereby increasing performance of fall armyworm (Spodoptera frugiperda, FAW). In a greenhouse experiment, we characterized the molecular responses to FAW-damaged and undamaged rice plants colonized or not colonized with mycorrhizae to identify candidate marker genes and gene networks involved in plant defense. Leaves were collected at 24 hours after larvae fed from rice plants subjected to four treatments: mycorrhizae FAW-damaged (MD) and undamaged plants (MUD), and non-mycorrhizae damaged (NMD) and undamaged plants (NMUD). Following the feeding, leaves of the plant were removed and the tissue was prepared for RNA isolation, and synthesis of cDNA. Transcriptome analysis documented differential gene expression among the four treatments. Validation of altered expression levels of eighteen unigenes that encode plant defense biosynthetic enzymes and transcription factors using quantitative Real-Time PCR (qRT-PCR) will be discussed to reveal nove underlying mechanisms during rice-AMF-FAW interactions. The primary genes of interest were plant defense genes associated with the salicylic acid and jasmonic acid pathways. Our results

indicate that AMF colonization causes changes in gene expression related to defense responses, with important consequences for rice-FAW interactions. Ongoing research will provide insights into the underlying mechanisms of plant resistance in rice.

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