**A group D MAPK protects plants from autotoxicity by suppressing herbivore-induced defense signaling**

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The mechanisms by which plants activate and enhance defense reponses have been well studied; however, the regulatory mechanisms that allow plants to avoid excessive defense responses are poorly understood. Here, we identified a group D mitogen-activated protein kinase (MAPK) gene from rice (*Oryza sativa*), *OsMAPK20-5*, whose expression was rapidly induced by infestation of gravid female adults of a destructive rice pest, brown planthopper (BPH, *Nilaparvata lugens*) but not by BPH nymphs. Expression silencing of *OsMAPK20-5* (irMAPK) increased the accumulation of ethylene and nitric oxide (NO) following gravid female BPH infestation, and thereby increased rice plant resistance to BPH adults and oviposited eggs. However, when exposed to high densities of gravid BPH females, irMAPK plants wilted earlier than WT plants, which could be attributed to the hyperaccumulation of ethylene and NO in irMAPK plants. Interestingly, when released into the field, irMAPK plants displayed broad resistance to BPH and white-backed planthopper (*Sogatella furcifera*), the two most destructive pests of rice, and produced higher yield. Taken together, our study shows that although OsMAPK20-5 can reduce the resistance of rice plants to planthoppers, it also enables rice plants to control excessive defense responses and thereby prevents defense response-related autotoxicity. {Max words limit 250}