Oryza sativa/Magnaporthe grisea: a model system for non-host interaction in cereals

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Resistance shown by a plant species to the majority of potentially pathogenic microbes is known as non-host resistance. The events leading to non-host resistance in plants represents one of the least understood phenomena and a remaining challenge in the field of plant-microbe interactions. Non-host resistance also represents one of the most promising defence mechanisms in developing durable resistance against plant pathogens, namely due to its effectiveness against a broad range of pathogen species and its durability in nature compared to race-specific R gene-dependent resistance. Rice-*Magnaporthe grisea* is a model pathosystem for race-specific cereal disease resistance study. At the species level, *Magnaporthe grisea* attack more than 50 monocots. However, at the strain level, this fungus exhibits a narrow host spectrum. We developed a biological model using rice cultivars and several non-host *M. grisea* strains (pathogenic on barley and wheat) to elucidate mechanisms implicated in non-host interaction. Cytological analysis helped us to pinpoint where the fungus is blocked in rice-*M. grisea* non-host interactions. We analysed defence gene expression using real-time quantitative PCR in the different non-host interactions. A reverse genetic strategy is underway to target rice T-DNA insertion mutants (Génoplante, France) that could be potentially affected in non-host resistance. It is expected that this model will shade some light into the genetic basis of non-host resistance defining the signalling and effectors components involved in these phenomena in rice and applicable to other cereal species.