biocontrol are bacteria from the genus *Pseudomonas*. They can produce antibiotics and siderophores, weakening the pathogen in the soil. Root colonisation by selected strains result in induce systemic resistance (ISR) effective against a broad range of root and foliar pathogens. Interestingly, no major changes in gene expression have been related to the ISR state in the plant. Instead, induced plants show potentiated defence responses after infection with the challenging pathogen, a phenomenon called 'priming'. We hypothesise that priming of pathogen-induced genes allows the plant to react more effectively to the invader encountered, which might explain the broad-spectrum action of rhizobacteria-mediated ISR. The molecular mechanisms underlying priming are currently under study. Understanding the mechanisms by which beneficial microorganisms help the plant to defend themselves is key for developing safe, durable and environment friendly strategies in crop protection.

Suppression of take-all disease in soils from organic versus conventional farms in relation to native and introduced 2,4-diacetylphloroglucinol-producing Pseudomonas fluorescens

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In three sets of experiments with soils collected from organic and conventional farms, take-all disease on barley, wheat or triticale, caused by *Gaeumannomyces graminis*, was more suppressed in organically managed than in conventionally managed soils where crops had been grown in rotation. This was true for soils with naturally occurring *G. graminis* and for soils amended with inoculum of *G. graminis* var. *tritici* strain R3-111a-1. Suppression of *G. graminis* var. *tritici* was positively correlated with bacterial diversity in soil as determined by denaturing gradient gel electrophoresis (DGGE) analysis of 16S ribosomal DNA genes amplified from DNA directly extracted from soil. Disease severity in a take-all suppressive soil, where wheat had been grown in continuous monoculture, was intermediate between that in an organic and a conventional soil with crop rotation. Natural populations of 2,4-diacetylphloroglucinol-producing *Pseudomonas* species were abundant in soil from the monoculture wheat field, less abundant in conventional soil where triticale had been grown organically for two years, and almost absent in soil from an organic farm. Populations of a *Gfp*-tagged, 2,4-diacetylphloroglucinol-producing strain of *Pseudomonas fluorescens* introduced in soil declined faster in organically managed than in conventionally managed soils, and did not contribute as much to take-all suppression in the former than in the latter soils. Thus, the natural mechanism of take-all suppression in organically managed fields may be different from that in conventional fields with monoculture wheat or triticale, where 2,4-diacetylphloroglucinol-producing *Pseudomonas* species may be of importance.

Characterization of an MFS transporter from Mycosphaerella graminicola as a potent multidrug transporter

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The ascomycetous fungus *Mycosphaerella graminicola* is the causal agent of a severe disease on wheat called septoria tritici leaf blotch. Screening of *M. graminicola* EST libraries led to the identification of *MgMfs1*, a full length Major Facilitator Superfamily (MFS) gene with high homology to putative toxin transporters involved in virulence. Complementation of a *Saccharomyces cerevisiae* strain deficient in multiple drug transporter genes with *MgMfs1* resulted in an impressive decrease in sensitivity of *S. cerevisiae* to a broad range of synthetic and natural toxic compounds indicating that the encoded protein, MgMfs1, is involved in multidrug resistance. We propose that MgMfs1 can act as a virulence factor of *M. graminicola* and can be a determinant of the pathogen in sensitivity and resistance to fungicides.