

Control of plant defense mechanisms and fire blight pathogenesis through the regulation of 6-thioguanine biosynthesis in *Erwinia amylovora*.

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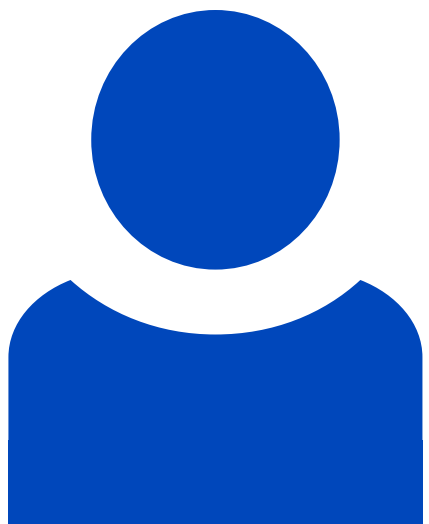
Abstract

Fire blight is a devastating disease of Rosaceae plants, such as apple and pear trees. It is characterized by necrosis of plant tissue, caused by the phytopathogenic bacterium *Erwinia amylovora*. The plant pathogen produces the well-known antimetabolite 6-thioguanine (6TG), which plays a key role in fire blight pathogenesis. Here we report that YcfR, a member of the LTTR family, is a major regulator of 6TG biosynthesis in *E. amylovora*. Inactivation of the regulator gene (*ycfR*) led to dramatically decreased 6TG production. Infection assays with apple plants (*Malus domestica* cultivar Holsteiner Cox) and cell cultures of *Sorbus aucuparia* (mountain ash, rowan) revealed abortive fire blight pathogenesis and reduced plant response (biphenyl and dibenzofuran phytoalexin production). In the presence of the Δ *ycfR* mutant, apple trees were capable of activating the abscission machinery to remove infected tissue. In addition to unveiling the regulation of 6TG biosynthesis in a major plant pathogen, we demonstrate for the first time that this antimetabolite plays a pivotal role in dysregulating the plant response to infection.

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