Use of Streptomyces spp. as biocontrol agents of wheat crown rot caused by fusaria

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Crown rot of wheat is caused mainly by Fusarium species and in specific climatic conditions can reduce production up to 50-90%. Biocontrol methods are an interesting approach to satisfy the increasing demand for alternatives to chemical fungicides. Streptomyces spp. act as growth promoters as well as biocontrol agents. Therefore, they are promising candidates for seed treatments, which combine their ability to produce a wide range of biologically active molecules with the potential to establish tight interactions with plants. Forty-seven Streptomyces spp. strains were selected among 1500, isolated from roots or rhizosphere of various crops. Their ability to reduce mycelial growth (up to 80%) of five Fusarium graminearum and F. culmorum strains (N=5), representing geographical, genotypic and toxigenic diversity, was determined in vitro. Streptomycetes showing inhibition >20% were further tested in vitro on wheat seedlings (cv. Bandera) for their ability to reduce disease symptoms. The root-necrosis was reduced up to 50% after 4 dpi. Moreover, the strains reduced the severity of crown rot up to 80% after 6 dpi in comparison to the untreated control. The selected strains did not inhibit the growth of the seedlings at the tested conditions. Further in vivo studies are foreseen to assess their plant growth promoting ability. Until now, our results confirm that streptomycetes are a promising source for developing organic seed treatments.