

KOLLY Thomas (2018) : Biocontrol of *Rhizoctonia solani* by two soil-borne fungi (*Trichoderma rossicum* and *Laccaria bicolor*), in vivo trials on wheat

Résumé

Soil-borne phytopathogens are a major source of plant disease. Economical losses due to the decrease of productivity of the infected crop play a key role in the costs of food production. In conventional agriculture, disease outbreak is mostly managed by the preventive application of pesticides. Phytosanitary products are known to be hazardous to human health and to pollute the environment. For these reasons and in a context of an intensification in the use of such products, a major biodiversity loss and the over-production of greenhouse gases were observed. In order to develop a sustainable agriculture, new methods of disease management are needed. Plants and microorganisms have co-evolved for millions of years together and are totally dependent on each other. Beneficial interactions between them can be used in an agricultural environment for plant growth promotion and pests control. In vitro data give information on potential biocontrol interactions between microorganisms. However, in vivo tests are needed to confirm the preceding hypothesis.

Previous experiments at the University of Neuchâtel demonstrated a synergistic interaction between *Trichoderma rossicum* and *Laccaria bicolor*, against the phytopathogenic fungus *Rhizoctonia solani* at a Petri dish scale. This work aimed to reproduce these laboratory observations at an environmental scale. Wheat was grown in pots and treated with *T. rossicum* and *L. bicolor* before being infected with *R. solani*. Plants treated with *T. rossicum* appeared to be less infected by the phytopathogen, but no positive effect on plant disease protection as a result of a synergistic interaction between the two fungi was shown. Results are promising and demonstrate the potential of fungal phytopathogen management by plant symbionts in agriculture. They also exhibit the necessity to select cultivars that can interact positively with beneficial microorganisms, as plant fast seed production and short life-cycle downregulate plant investment to their roots.

Mots-clefs: biocontrol, phytopathogen, plant-growth promotion, cultivar, ectomycorrhiza