



Master's thesis opportunity

Using fungal-bacterial consortia as microbial inoculants in sustainable agriculture

Context: In the field of microbial inoculants applied to the soil to protect or promote plant growth, single microbial strains (either a bacterium or a fungus) are traditionally used. While these bioinoculants usually perform nicely in laboratory assays, their activity in soils is often inconsistent. Recent research has demonstrated that using a mixed inoculum, consisting of a fungus and one to several bacterial species, produces a more robust bioinoculant, with more consistent effects on the plant grown in soil due to synergistic and complementarity effects. Therefore, such an approach could represent an alternative to agrochemical to be applied in sustainable agriculture. This master project would be part of a larger applied project aiming at releasing concomitantly, and in an active form, a consortium composed of bacteria and a fungus that act as biocontrol agents against a generalist soil-borne plant pathogen, *Rhizoctonia solani*. The specific aims of this MSc project are to evaluate the performance of two bioinoculant mixtures on the growth of different crops along with their ability to inhibit mycelial growth and sclerotia germination in different *Rhizoctonia solani* strains. Moreover, the pesticide tolerance of the selected microorganisms will be evaluated in order to verify their potential of application in conventional agriculture.

Goals: **1)** Evaluate the effectivity of the bioinoculant on the growth of different crops (*in-vitro*) ; **2)** Test the biocontrol effect of selected microorganisms on different *Rhizoctonia solani* strains (anastomosis group) ; **3)** Test the inhibition effect of certain pesticides on the selected microorganisms.

Knowledge and skill required: High motivation for experimental work, interests for bacterial-fungal interactions and sustainable agriculture. Good knowledge of both French and English.

Keywords: biocontrol agent, fungal highway, anastomosis, biocontrol agents development

Working place: Laboratory of Microbiology, University of Neuchâtel and Agroscope ACW.

References:

1) Ade, C. (CTIFL), Demoisson, V. (CTIFL), & Langlet, X. (DGAL-S. (2014). Utilisation de microorganismes antagonistes contre *Rhizoctonia solani*. *Technique*, 304, 54–62. 2) Matheron, M. E., & Porchas, M. (2004). Growth of *Sclerotinia minor* and *S. sclerotiorum* and Development of Lettuce Drop. *Plant Disease*, 88(6), 665–668.

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