



## Master internship at Agroscope

### Title

Biocontrol potential of mycoviruses infecting *Botrytis cinerea*

### Introduction

*Botrytis cinerea*, the gray mould agent, is a necrotrophic fungal species that causes enormous loss in agriculture, particularly during post-harvest storage of fruits such as grapes. The current control method of this pathogenic organism relies on the use of synthetic fungicides. In addition to environmental issues, the massive use of such chemicals has led to the emergence of resistance. Eco-friendly alternatives are therefore being developed, such as the use of essential oils and biocontrol agents. Mycoviruses, *i.e.* viruses infecting fungi, have also been proposed due to their ability to modulate their host virulence.

We have recently identified new mycoviruses in our local collection of *Botrytis* species. For this internship, the student will reconstruct the full-length genomic sequences of those viruses using high-throughput Illumina sequencing. This will enable bioinformatics analyses on structural and functional genomics as well as phylogenetic analyses. The impact associated with viral infection in terms of growth, reproduction and disease development will be investigated to evaluate the possibility of the practical use of those mycoviruses as control agents.

This internship will be the ideal opportunity to develop practical skills in virology, mycology and plant pathology. Furthermore, the student will use classical molecular biology techniques such as DNA/RNA extraction, PCR and gel electrophoresis. The student will also develop bioinformatics skills for sequence analysis and primer/probe design.

The internship will be supervised at the scientific and technical level by Mathieu Mahillon - postdoc in the group - as part of a larger scientific team including virologists and mycologists from Agroscope.

### Indicative bibliography

*Mycoviruses in Biological Control: From Basic Research to Field Implementation*

M. D. García-Pedrajas, M. C. Cañizares, J. L. Sarmiento-Villamil, A. G. Jacquat, and J. S. Dambolena  
*Phytopathology* 2019, 109:11 1828-1839

*Botrytis cinerea: the cause of grey mould disease*

B. Williamson, B. Tudzynski, P. Tudzynski and J.A.L. Van Kan  
*Molecular Plant Pathology* 2007, 8:561-580

*Hypovirulence and Double-Stranded RNA in Botrytis cinerea.*

M. D. Wu, L. Zhang, G. Q. Li, D. H. Jiang, M. S. Hou, H-C. Huang  
*Phytopathology* 2007, 97(12):1590-9

*Characterization of a novel bipartite double-stranded RNA mycovirus conferring hypovirulence in the phytopathogenic fungus Botrytis porri*

M. Wu, F. Jin, J. Zhang, L. Yang, D. Jiang, G. Li  
*Journal of Virology* 2012, 86(12):6605-19

*Five Questions about Mycoviruses*

M. Son, J. Yu, K-H Kim  
*PLoS Pathogens* 2015, 11(11): e1005172



## Information about Agroscope

Agroscope is an innovative research institute for agriculture and nutrition. Agroscope is part of the federal administration and is attached to the Federal Department of Economic Affairs, Education and Research EAER. It has research stations at a number of sites around Switzerland.

We offer a stimulating work environment in a multidisciplinary research team as well as a close support throughout the project. Agroscope has excellent research facilities with well-equipped laboratories, greenhouses, climate chambers and sites for field experiments and field studies.

## Place of Work

1260 Nyon (Changins) VD - Switzerland

## Application

If this challenge appeals to you we look forward to receiving your e-mail application to [mathieu.mahillon@agroscope.admin.ch](mailto:mathieu.mahillon@agroscope.admin.ch) or [olivier.schumpp@agroscope.admin.ch](mailto:olivier.schumpp@agroscope.admin.ch)

For further information, please feel free to contact Dr. Mathieu Mahillon, (+41 58 463 43 08) or Dr. Olivier Schumpp (+41 58 460 43 71).

Start date: 1 September 2021 or upon agreement.