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**Funding
Cifre**

2016-2019



UMR IGEPP

Institute for Genetics,
Environment and Plant
Protection

Inra - Agrocampus
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Team name

Resistance and
adaptation

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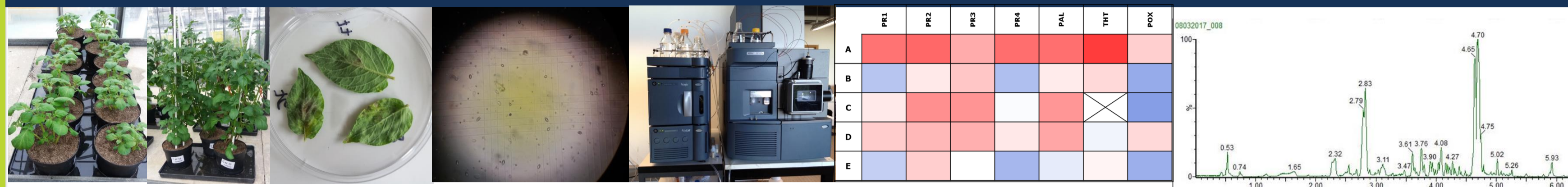
Roullier Group



Keywords

Solanum tuberosum
Potato Late Blight
Bioncontrol

Study of action mode of defense elicitors in the pathosystem Potato / *Phytophthora infestans*



Social-economic context

The management of crop protection is frequently made with pesticides. This situation leads to adverse environmental effects, as a result, European policies try to decrease pesticide use. It's the case of *Phytophthora infestans*, an oomycete, responsible for potato late blight. Due to aggressiveness of this disease, the only way to control is with several fungicide applications. Thus, a major scientific challenge is to develop alternative methods such plant breeding and biocontrol.

Scientific context

A pathogen can modify the physiological state of the plant host. This process starts by plant's perception of pathogen-associated molecular patterns (PAMPs). Following a recognition by the receptors which in turn induces a cascade defense genes and produces antimicrobial compounds (metabolites and proteins), this process reduces pathogen's infection¹. Exogenous molecules are able to induce plant's defense responses. The biocontrol product BION® (Syngenta) is a successful example of commercial elicitor that induce plant's defense, especially in Tomato and Tobacco plants². However, in many cases, elicitors could present a good efficiency (expressed by a reduction of pathogen's infection) in laboratory conditions. Although when they were challenged in the field, the effects were not observed. To go further, we should understand how the elicitors work in plants protection.

Objectives

A comprehension of the elicitors mode of action is the aim of this thesis. For that, we will answering key questions:

- (1) Does defense induction depends on the elicitors' nature ?
- (2) How the resistance level of varieties influence the defense responses ?
- (3) Does young plants responds as older plants to elicitors?

The experiments will be based on three genotypes of potato, Bintje, BF15 and Désirée chosen by their various resistance level against *P. infestans* and its induced by different elicitors: a PAMP of *P. infestans* – (a concentrated culture filtrate), an algae extract (Ulva) and a synthetic elicitor - β -aminobutyric acid (BABA).

Our aim is to develop a comparative study of genotypes profiles induced with the three elicitors by a non-target metabolomic analysis. High performance liquid chromatography-mass spectrometry will be used on this study. Metabolic analysis will be complemented with a transcriptomic analysis on target defense genes.

Perspectives

The identification of metabolites involved in potato defense could show how work efficiency of this three elicitors. The individuals molecules will indicate the pathway taken by each elicitor. So this knowledge may be used to improve the elicitor's management under field conditions.

Literature cited: 1 - Jones JDG, Dangl JL. 2006. The plant immune system. Nature, 444: 323–329.
2 - Achuo, E. A., Audenaert, K., Meziane, H., & Hofte, M. (2004). The salicylic acid-dependent defence pathway is effective against different pathogens in tomato and tobacco. Plant Pathology, 53(1), 65–72.

