

PREDIPATH

Project title: Design of marker sets and online tools to predict plant pathogenicity of bacteria

Acronym: PREDIPATH

Project duration: 24 months – Start date: 30/10/2017 End date: 16/03/2019

Key-words: comparative genomics, predictive tool, genotypic markers, bacteria, plant pathogens

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Financial support : 85 000 €: 21 000 € from UBL (Université Bretagne Loire), 64 000 € from Objectif Végétal (48 700 €from ALM, 15 300 €from Région Pays de la Loire)

Summary:

Plant pathogenic bacteria are responsible for huge socio-economic impact in agroecosystems. Whereas sustainable plant health management requires accurate identification of the pathogens their identification is not straightforward. This is even more challenging when non-symptomatic samples are analyzed, for instance during sanitary control of plants and seeds or during ecological studies aiming to decipher the ecological niches of plant pathogens. Furthermore, development of biotechnology based on microbial resources (including biocontrol) leads to an increased demand for evaluation tools that could predict the safety of selected microorganisms for plants. An equivalent need emerge from user satisfaction surveys of the French collection of associated bacteria (CIRM-CFBP) whose users are eager to precisely know the pathogenic status of preserved strains.

The aim of this project is to take advantage of the numerous whole genome sequences of plant pathogenic bacteria available to identify genetic and genomic markers of plant pathogenicity and to develop web tools that could help to predict if a given bacterial isolate could be a plant pathogen only based on its genome. In the future, such a web tool could replace, in part, time and cost consuming pathogenicity assays by restricting these tests to ambiguous results.

First, datasets composed of plant pathogenic bacteria and their commensal relatives will be set up. Comparative genomic analyses between these two kinds of bacteria will allow deciphering the gene content and genome traits characteristics of plant pathogens. Association analysis using statistical and correlation tests will be performed to link genotype features to the pathogenic profile of the strains. A blind test will allow evaluating the performance of the method. Pipelines and web tools developed in the frame of this project will be available on a web-based portal for plant pathologists and diagnosticians.