



**HAL**  
open science

## Population dynamics of *Pseudomonas syringae* in leaf litter and snowpack in the southern french Alps

Caroline Monteil, Caroline Guilbaud, Catherine Glaux, Francois Lafolie,  
Cindy E. Morris

### ► To cite this version:

Caroline Monteil, Caroline Guilbaud, Catherine Glaux, Francois Lafolie, Cindy E. Morris. Population dynamics of *Pseudomonas syringae* in leaf litter and snowpack in the southern french Alps. 9. International symposium of the microbial ecology of aerial plant surfaces, Aug 2010, Corvallis OR, United States. hal-02751736

**HAL Id: hal-02751736**

**<https://hal.inrae.fr/hal-02751736v1>**

Submitted on 3 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

**9th International Symposium on the Microbiology of Aerial Plant Surfaces. August 15-18, 2010, Corvallis, USA**

**POPULATION DYNAMICS OF *PSEUDOMONAS SYRINGAE* IN LEAF LITTER AND SNOW PACK IN THE SOUTHERN FRENCH ALPS.**

Caroline L. MONTEIL<sup>1</sup>, Caroline GUILBAUD<sup>1</sup>, Catherine GLAUX<sup>1</sup>, François LAFOLIE<sup>2</sup> and Cindy E. MORRIS<sup>1</sup>

1-INRA, Unité de Pathologie Végétale, Domaine St Maurice, BP. 94, 84140 Montfavet cedex, France.

2-INRA, Unité Climat-Sol-Environnement, Domaine Saint-Paul, Site Agroparc, 84914 Avignon, France.

The recent revelation that the life cycle of the plant pathogen *Pseudomonas syringae* is closely associated with the water cycle raises novel questions about the role of non agricultural niches of plant pathogens in disease epidemiology. In addition to cultivated plants, *P. syringae* is frequently found in rain and cloud water, in alpine rivers, in wild plants and in annual snow pack. In temperate zones, snow pack is the major source of river water during the season of crop growth. Prior to its melting, snow covers the remains of alpine vegetation (both litter and senescent plants) and insulates the soil from sub-zero temperatures. Thus this environment could play an important role in the survival and diversification of *P. syringae*. In this light, our objective is to elucidate the dynamics of population size and structure for *P. syringae* in leaf litter and the covering snow pack in the Southern French Alps. We estimated abundance and genotypic diversity (rep-PCR) of *P. syringae* in the leaf litter and the snow cover at four sites in the Southern French Alps during two months in 2010. At each site we also sampled freshly-fallen snow to determine the sizes of incoming populations. *P. syringae* was detected in snow pack and the covered plant material ("leaf litter") regularly at all sites during the sampling period, and occasionally in precipitations. Abundance and population structure was stratified from the leaf litter to the top of the snow pack. The whole of our field and microcosm studies at these sites indicates that in the winter, *P. syringae* arrives in the catchment with the first snow falls. Strains from early snow falls constitute a part of the populations in the 10 cm-layer of snow pack in contact with the soil. The other part of this population is composed of strains from the leaf litter. Rapidly after the early snow falls, bacteria from leaf litter emigrate into the snow pack where they survive, multiply and die during the winter as a function of organic matter availability, humidity, the low conductivities and the temperature (always 0°C in the snow cover). To better understand how selection pressures influence the population structure of *P. syringae*, phenotypic (ice nucleation activity, production of toxins, and pathogenicity) and genetic (housekeeping gene sequencing) characterization is in progress.