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

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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.