

## **English summary**

All species on Earth have interactions with others species. These interactions can be positive, negative or neutral, for both or just one of the individuals of the interaction. These interactions create the complex web of life in which we live.

Dispersion is an essential process that organisms use to spread its distribution, resulted in many cases from the necessity of finding new food sources or more appropriated environmental conditions.

Dispersion can happen in an active way by the own organism, or passively mediated by abiotic (e.g. wind, rain) or biotic factors (e.g. dispersion of pollen by pollinator or seeds by birds). Microbes are spread everywhere, however its dispersal processes are still poorly known. Their small size, the easily biological contamination of the samples and the necessity of special techniques for species identification, making tracking them a difficult process.

Insects can be one of the vector for bacterial dispersal. Insects can produce antibiotic compounds to protect themselves against pathogenic microorganisms, but also have positive interactions with non-pathogenic ones. Specifically, social insects such as ants produce stronger antibiotic compounds, having a stronger effect in selecting microorganisms. This selective way of interactions can lead to the dispersion of only a selected group of microorganisms, affecting the direction in which the microbial communities are shaped.

On the other hand, ants also have a close relation with plants, where they can look for food sources or nesting places. This relation opens the door to microbes to be highly dispersed to the aerial parts of the plants, due to the large number of individuals and the high activity they can have, by using ants as transports.

The microbial communities can have a positive relation with the plant or negative one and lead to plants diseases. Therefore, the plant health status is connected with their associated bacterial community.

My study focuses on three main questions: 1) what is the effect of *Formica polyctena* ants on bacteria dispersion from soil to tree leaves, 2) how, both ants and bacteria, affect the health status of the tree and 3) how tree-ant nest distance and the intensity of ant foraging on trees affect the leaf- associated bacteria community and photosynthetic efficiency as proxy of three health.

I plan to collect bacteria associated with ants, tree leave and soil and by using modern genetic techniques I am going to identify what kind of bacteria community is present in each of this sample. This allow me to check which bacteria are common and which specific for ants, tree and soil. Moreover, I can detect whether ants can be a vector that spread bacteria between soil and plants. I also assume that bacterial communities are richer on trees with high ant activity and such trees are in better condition so the photosynthetic efficiency is higher for such trees. If this would be a true I can demonstrate that ants can create a hotspots of bacterial communities and affect primary productivity in the forest.