

The ecology and evolution of myrmecomorphy

Ants (Formicidae), are a large family with more than 15,000 species and can be considered an enormous ecological success due to their social organization. This success is so important that several insects, but also other arthropods such as spiders have mimicked them: this is referred to as myrmecomorphy. The similarity between ants and their mimics can be morphological but also behavioral or chemical. Myrmecomorphy has been recorded in more than 2000 species belonging to over 50 different families of arthropods and is widespread on all continents, except Antarctica. However, the ecological and evolutionary causes and consequences of these processes are still little explored.

The aim of this project is to categorize interactions between ants, myrmecomorphs and predators on a large spatial and temporal scale in order to understand why we observe such an advergence of arthropods towards these particular hymenopterans.

To achieve that, we will use several approaches to categorize these interactions:

1. A comparative morphometric study of the myrmecomorphs and of the ants they mimic in order to evaluate the level of morphological convergence between these taxa. Color will also be taken into account to establish to what extent the mime resembles the mimic.
2. A behavioral study of the interaction partners, characterizing the movement patterns and trajectories of interaction partners
3. A study of chemical mimicry because it is known that some myrmecomorphs have the ability to absorb, synthesize or copy cuticular hydrocarbons involved in individual recognition for ants. Comparing the structure of these compounds in ants and their corresponding mimes would reveal, not only visual but also, olfactory similarity which may be important for some predators.

Once these interactions are categorized, they will be compared not only on an evolutionary time scale through comparative phylogeny analysis but also on a spatial scale through macroecology and possibly historical biogeography approaches. Collectively, these projects will explore how, where and when these particular and surprisingly common interactions have evolved.