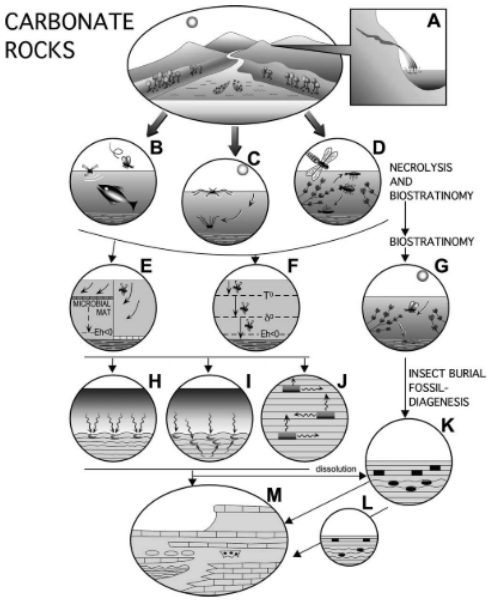
Master Projects with Fossil Darwin wasps

at the Natural History Museum Basel

Darwin wasps (Ichneumonidae) are the largest family of parasitoid wasps, with over 25'000 described species. They are at the top of the insect food web, but despite their ecological importance, they are among the most poorly studied groups of organisms. Their fossil record is even more poorly understood than their extant diversity, even though studying fossil species can lead to highly important insights about the history of the group and its species composition in past times.

Project 1: Buried in sediments for more than 50 million years – what happens with a wasp exoskeleton?

In this project, you will go to the bottom of how Darwin wasps fossilize. Compression fossils are the main source of information about the age and past diversity of Darwin wasps. We need to rely on interpretations of their morphology to taxonomically place and identify them, but it is often difficult to interpret a fossil and its structures Thus, we need to understand how a wasp body behaves when it is buried in sediments and comes under pressure from above. Sometimes you cannot be sure if what you see in a fossil is an actual structure of this species or just a crack in the exoskeleton caused by external force. In this project, you can test what happens with Darwin wasps during the fossilization process by means of experiments with extant taxa. The aim of this project is to shed light on the taphonomy of Darwin wasps, supporting interpretation of fossils, especially with respect to the middle part of the body. The results of this project will be used to interpret morphology of some of the oldest Darwin wasp fossils from the Mesozoic.



Martínez-Delclòs et al. (2004) - Taphonomy of insects in carbonates and amber

Project 2: Species diversity of Darwin wasps in amber from the Early Eocene

The Darwin wasp fossil record is poorly understood. Only 277 fossil species have been described to date. Even though Darwin wasps are abundant in amber and amber fossils are easier to describe than compression fossils, only around 30 species were described yet. Amber fossils have the advantage that more details are visible, the specimens are not deformed by compression, often internal soft tissues are preserved (visible in micro-CT scans), and they may even retain evidence of the animals cause of death.

By studying the subfamilies and species found in Oise amber (~53 Ma) from France, you would contribute to the unravelling of the diversity of Darwin wasps in amber from the Early Eocene epoch. Only one species is described from Oise amber until now, and its taxonomic placement needs to be revised. In this project you will help to understand the fossil assemblage found in Oise amber by taxonomically placing and describing around 10-15 new species.
Additionally, you can compare your found species diversity to the one already found in the Fur Formation in Denmark, a similar deposit regarding age. With this comparison this project helps estimating the bias of fossilized species found in amber versus sediments.

If you have questions or want to know more about those projects, do not hesitate to contact us (alexandra.viertler@bs.ch, seraina.klopfstein@bs.ch)