



COEVOL MULTI-SCALE COEVOLUTION

EVOLUTIONARY GENETICS OF INTERACTIONS GROUP

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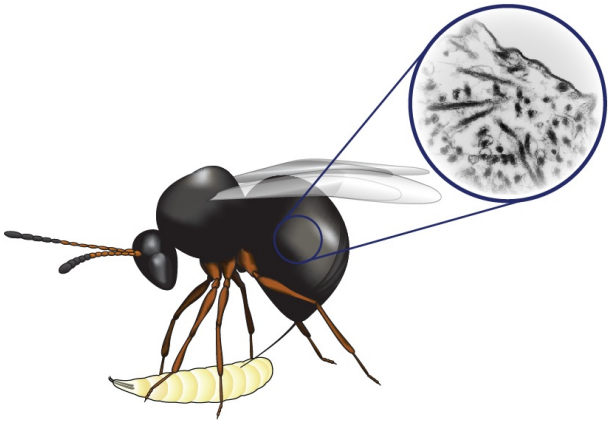
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My work focuses on the **evolutionary genetics of insects**. I am currently developing three main themes:

1. Organisms face many viral infections during their life. Although viruses are known for their pathogenic effects, a number of them, under studied, reveal more subtle effects, and are potentially heritable. We have discovered such a virus in a parasitoid wasp. Its main effect is to **manipulate the wasp's egg-laying behavior**, thus promoting its horizontal transmission. To improve our global understanding of insect-associated viral diversity we are conducting metagenomic programs in insect communities.
2. During evolution, sequences of these viruses have been able to integrate into the chromosomes of their hosts (whether or not the integration is part of their natural cycle). Some of these insertions have allowed major genetic innovations such as the "invention" of the placenta in mammals. In hymenopteran insects, which live as parasites of other insects, several clades have "domesticated" viruses, which allows them today to address virulence factors to their hosts. These endogenized viruses are currently necessary for the good development of parasitoids. The first documented cases concerned the superfamily Ichneumonoidea. Our recent work has revealed similar phenomena, although completely independent, in other superfamilies (Di Giovanni et al. 2020, thesis in progress B. Guinet). One of the challenges is to define the extent and evolutionary impact of these **domestications in insects**.
3. Bed bugs are a re-emerging pest. These hematophagous insects have experienced an extremely large population boom in recent years, probably related to the **evolution of insecticide resistance**. We are currently investigating the genetic determinants underlying the resistance phenotype (CIFRE thesis in progress Chloé Haberkorn).



Parasitoid depositing an egg (and its virus) in a *Drosophila* larva. (drawing credit : J. Martinez)