

## Project offers in insect-symbiont research

The Klasson lab has open positions for research training/project work focused on Insect Symbiosis research. Projects can be either bioinformatics-focused or lab-based. Start date and project duration are flexible.

### Background

Bacterial symbionts are commonly found in insect species, and can affect their hosts in strong and unexpected ways. Endosymbionts are known to affect host reproduction, behaviour, survival, and protection against natural enemies and pathogens. We study symbiont-insect dynamics with focus on one of the most common worldwide symbionts, *Wolbachia*, in *Drosophila* systems. We use both lab-based molecular and ecological techniques alongside sequencing and bioinformatics to understand how microscopic organisms can change host ecology.

We have two projects currently open for application.

#### 1. *Drosophila-Wolbachia*: Facultative and obligate relationships

- We have a number of *Drosophila* species in the lab with both facultative and obligate infections of *Wolbachia*. Some are high-density infections while others with virtually undetectable by common PCR - something that is almost certainly common in field populations. We are interested in understanding how the presence of *Wolbachia* affects fly traits such as development, fitness and survival under stress, and how this is affected by a facultative or obligate relationship. Different *Drosophila* species are currently being cured from their infections using antibiotics, so we will be able to compare *Wolbachia* effects in the same fly lines. There is a large scope of possibilities for testing, and the student would have the ability to direct their project according to their interests. Techniques used will include fly culture, ecological tests and some molecular work (DNA extraction, PCR, potential for qPCR)

#### 2. Screening for symbionts in arthropods

- We are collecting insects and crustaceans from aquatic locations around Uppsala with the goal of testing them for symbionts. We are currently processing the first rounds of collections, which include aquatic insects, copepods and isopods. Student projects could center around composition of sampled species throughout the season, symbiont diversity in different types of arthropods, or symbiont dynamics across time or geographic location. Techniques used could include sampling of insects, insect handling/dissections, DNA extraction and PCR. The project can be developed according to the interests of the student.
- For students interested in bioinformatics, another of our goals in this project is to screen publicly available genomic data of insects and crustaceans for the presence of symbionts, with the goal of finding new host-microbe associations or different strains of known symbionts. The student involved with this project would learn how to obtain and use data from public genome databases, how to do metagenomic assembly of markers of interest and how to obtain taxonomic identities of assembled sequences. Depending on the results of the initial screening, work could move into creating phylogenetic trees to place sequences of interest into an evolutionary context or into more complete comprehensive assembly of particular genomes.

For more information, please contact Lisa Klasson ([lisa.klasson@icm.uu.se](mailto:lisa.klasson@icm.uu.se)) with any questions.