

Morphological differences of two contrasting thermal populations of *Daphnia pulex*

*Undergraduate level internship (Licence 2^{eme}-3^{eme} année/ Bac +2 or Bac +3)
supervised by: Soraya Álvarez Codesal & José M. Montoya
Theoretical and Experimental Ecology Station, Moulis, CNRS, France*

Internship overview and objectives

The student will collect and analyse morphological data of two different populations of the water flea, *Daphnia pulex*. Measurements will include body length (and possibly other morphological features), conversion into dry and wet weight, presence and number of eggs and ephippias (resting eggs). The intern will work side-by-side with FragClim project members to process zooplankton samples, collect morphological data, and manage an experimental database for statistical analysis. The student will acquire multiple skills during the course of this project as well as it would increase their confidence in working in a laboratory setting as follows:

- Learn day-to-day basics of laboratory work and protocols in a microbiology lab
- Learn laboratory processing and manipulation of aquatic zooplankton samples for morphological measurements
- Develop knowledge in database management for statistical analysis in the R programming language

Scientific objective:

Warming is a major component of global change. One of its reported effects is reduction in body mass across several taxa, although evidence is not unequivocal. Here, in this project we aim at testing whether populations of *D. pulex* in two contrasting temperatures over 14 years differ in their body mass.

Project summary:

About the project:

This internship is part of the FragClim project. FragClim uses a novel experimental platform at the Theoretical and Experimental Ecology Station (SETE, UMR 5321) to study the effects of anthropogenic habitat fragmentation and warming on biodiversity, community dynamics, and ecosystem functioning in complex aquatic communities. Ectotherms inhabiting aquatic systems are expected to be negatively affected by habitat warming because their body temperature and physiological responses depend on the environment. In planktonic organisms, such as water fleas, a common negative relationship exists between temperature and body size of the organism. The data collected during this internship will ultimately be used to size-correct the response of metabolic rates of water fleas under different temperatures.

About the station:

The Theoretical and Experimental Ecology Station (SETE, UMR 5321) is an UMR of the French National Centre for Scientific Research (CNRS) and the University Paul Sabatier (UPS) located in Moulis, Ariège (09200). The main objective of SETE is to advance fundamental knowledge in ecology and evolution as well as developing sustainable environmental management. Since 2009, SETE has developed multiple projects related to freshwater aquatic ecology, including the Meta-Aquatron used by FragClim, an outdoor experimental platform of artificial ponds where temperature and fragmentation can be manipulated.

Student profile and skills

This short project focuses on an empirical approach to an ecological question. Therefore, we are looking for an intern with genuine interest in ecology and who will enjoy the challenge of helping us getting and analysing zooplankton data. The student should have interest in empirical research, laboratory work and in using analytical tools. The following skills are desired:

- Previous laboratory experience in using binoculars and microscopes
- Interest in acquiring programming skills and statistics (e.g. Excel, R software)
- An analytical mind and curiosity to learn more
- Intermediate English level (B1/B2 minimum)
- Interest for learning zooplankton and phytoplankton maintenance in the lab
- Undergraduate Student of 2rd or 3rd year (Licence 2^{eme} - 3^{eme} année / Bac +2 or Bac +3)

Student stipend:

According to current regulations ~ 550 € /month

Length of the internship:

2-month internship occurring between March – May 2020

Supervisors:

Soraya Álvarez Codesal (CNRS, PhD student): soraya.alvarezcodesal@sete.cnrs.fr

Jose M. Montoya (CNRS): Josemaria.MONTOYATERAN@sete.cnrs.fr

Application process:

- To apply please email your CV and a short statement (<300 words) describing your interest to: soraya.alvarezcodesal@sete.cnrs.fr
- **DEADLINE:** 21 February 2020
- Accommodation (150 € /month paid by the student) at en-suite private room with sharing kitchen facilities may be available at the Moulis station upon request during the course of the internship for the student