



## STAGE DE RECHERCHE M2 ECOLOGIE EVOLUTION GENOMIQUE

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### The bacteria within : epigenetic study of endosymbiosis

UMR INRA-INSA de Lyon

Biologie fonctionnelle, Insectes et Interactions (BF2I)

Encadrante : Rita Rebollo (rita.rebollo@insa-lyon.fr)

Symbiosis is an association between two or more organisms and it occurs at different levels of integration. The most integrated association is called endosymbiosis, in which the endosymbiont is secluded in host specialized cells, the bacteriocytes, and is transmitted maternally through generations. While it is well admitted that endosymbiosis is a driving force in species adaptation and evolution, very little is known **about its impact on host genome structure, transcription and regulation**. There are many well-studied mechanisms responsible for gene expression changes, both transcriptionally and post-transcriptionally. Epigenetic mechanisms, *i.e.* DNA methylation, histone post-translational modifications and small RNAs are known to be labile to environmental changes therefore, any challenge endured by the host can impact epigenetic regulation. **Hence, we hypothesize that the process of endosymbiosis establishment disturbs host epigenetic regulation of key gene networks.**

Weevils are common crop pests causing an estimated worldwide loss of hundreds of millions of dollars and hence their study is crucial for ecologic and economic reasons. In order to understand the molecular dialogue occurring between hosts and endosymbionts, and hence grasp the impact of symbiosis establishment on the host genome, it is important to focus on the initial evolutionary steps of endosymbiosis. Hence, we will study the association between *Sitophilus oryzae* and *Sodalis pierantonius*. *S. pierantonius* is the only endosymbiont observed in *Sitophilus* with the exception of *Wolbachia* that may infect certain strains. It infects a restricted set of weevil tissues and exhibits a highly contrasted dynamics during host development.

We are looking for a highly motivated master student, who will be responsible for determining endosymbiont load in hosts where epigenetic pathways have been suppressed. The student will learn how to manipulate weevils, how to perform quantitative PCRs and eventually how to assay for epigenetic marks in mutants using immunoprecipitation methods. The student will be closely working with the supervisor and other members of the team. We expect a proactive person who enjoys being part of a team. Perspectives will involve molecular biology methods but also bioinformatics

BF2i laboratory hosts a diverse multinational team, studying two main system models, weevils and aphids, and it is at the frontier of the fundamental and applied research. The supervisor, Rita Rebollo, has recently been recruited as a researcher and will spearhead this pioneering project.