

### Encadrement :

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### Titre du stage :

**Cost of the « adaptive » innate immune response in the mealworm beetle, *Tenebrio molitor*.**

### Mots clés :

ecological-immunology, innate immune memory, life history trade-offs, insect immunity

### Résumé :

There are now cumulative evidences demonstrating that the innate immune system of invertebrates is able to produce immune responses involving memory either nonspecific or specific. As different mechanisms underlie acquired immunity in vertebrate taxa, the general term ‘immunological priming’ is currently used to refer to the “adaptive” innate immune response of invertebrates. Factors favouring the selection of such an adaptive innate immune response are still unclear. At least, previous experience of a pathogen provides the animal host with a higher survival probability upon subsequent infections by the same pathogen type. However, this might not be a sufficient selective advantage if the secondary immune response, that is the immune response develops against a pathogen that the immune system of the host already experienced, is not less costly than the primary one, that is the immune response developed upon the first encounter with the pathogen. To test this hypothesis, the proposed project aims at comparing the fitness cost of primary and secondary immune responses in the mealworm beetle, *Tenebrio molitor*. To this purpose, we will expose insects to combinations of two immune challenges with various micro-organisms to generate insect groups that produced either primary and secondary immune responses or primary immune responses only. Relevant life history traits will be compared between these groups to quantify the costs associated with each type of immune responses.

### Deux références bibliographiques:

Moret Y, Schmid-Hempel P (2000) Survival for immunity: the price of immune system activation for *Bumblebee Workers*. *Science* 290: 1166-1168 doi:10.1126/science.290.5494.1166

Moret Y, Siva-Jothy MT (2003) Adaptive innate immunity? Responsive-mode prophylaxis in the mealworm beetle, *Tenebrio molitor*. *Proceedings of the Royal Society B: Biological Sciences* 270:2475-2480. doi: 10.1098/rspb.2003.2511.

### Techniques mises en œuvre:

Insect rearing and manipulation, microbiology, immunology, biostatistics.

### Compétences particulières exigées:

Applicants should develop interests in evolutionary ecology and, eventually, in insect immunology. Basic knowledge in statistics will be required and the ability to work independently will be appreciated.

A retourner à Loic Bollache (bollache@u-bourgogne.fr)