PhD position: Stress response and resilience in honey bees

UR 406 Abeilles & Environnement, INRA Avignon, France

Honey bee populations are currently experiencing serious losses, notably in Northern America and Europe, which is a fundamental issue regarding the maintenance and the biodiversity of natural and agricultural ecosystems. The origin of this decline is likely multifactorial because honey bee colonies are facing a multitude of stressors (parasites, xenobiotics, lack of nutritive resources…). Given the diversity of those stressors, there is a need to characterize and better understand the physiological processes involved in general stress responses, in order to ultimately improve the stress resilience of bees.

Recently, a new role for allatostatins in honey bee stress response has been discovered by J.-M. Devaud et al (Research Center on Animal Cognition, Université Paul Sabatier, Toulouse, France). Due to their properties, these peptidic neurohormones are likely involved in the regulation of stress response. The goal of the PhD project will be to further understand the role of allatostatins and their receptors in the control of stress response and resilience in bees. This will be done by using different molecular, physiological and behavioral approaches.

The first step will be to determine the link between allatostatin levels and stress susceptibility by measuring the response to different stressors in bees naturally-expressing different levels of allatostatins (or by manipulation of their levels). Afterward, the objective will be to improve the stress resilience of bees and evaluate the effects at the individual and colony levels, notably by using automatic recording of bee behavior and measuring colony fitness.

The thesis will be completed within the framework of the ANR project *ASTRAPIS: Allatostatin receptors and stress resilience in honey bees*. The candidate will work in the Unit Abeilles & Environnement, INRA Avignon (France) and in collaboration with the Research Center on Animal Cognition (Université Paul Sabatier) with a possibility to perform some experiments in the lab of Andrew Barron (Department of Biological Sciences, Macquarie University, Australia).

Funding

The PhD student will be funded for 3 years within the ANR project ASTRAPIS: Allatostatin receptors and stress resilience in honey bees.

Doctoral school

Université d'Avignon et des Pays de Vaucluse, École Doctorale 536 «Sciences et Agrosciences»

Candidate profile

We are looking for a candidate with a Master's degree in Biology and a strong background in insect physiology and animal behavior. Good competency in molecular biology and English will be greatly appreciated.

The candidate should not have known allergies to bee stings.

Supervisors

Cédric Alaux (INRA, CR2, cedric.alaux@avignon.inra.fr, principal supervisor), Yves Le Conte (INRA, DR1, leconte@avignon.inra.fr).

The possibility will be considered, for the candidate to apply for an international Cotutelle program (complementary co-supervision fellowship) between France and Australia (Andrew Barron, Department of Biological Sciences, Macquarie University)

How to apply

The application should include a detailed CV and a one-page cover letter. Two reference letters will be appreciated but not a requirement. The documents should be sent by email to Cédric Alaux (cedric.alaux@avignon.inra.fr) before the 15th September 2013. Selected candidates will then be interviewed. PhD start is expected in January/February 2014.

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