

ELISA Project

EVALUATION OF THE IMPACT OF DIFFERENT STRESSORS (POLLUTANTS AND PATHOGENS) ON THE GUT MICROBIOTA OF THE HONEYBEE *APIS MELLIFERA*

The origin of honeybee colony losses is now considered to be multifactorial, with a strong emphasis on both parasites and pesticides. Indeed, foraging activity exposes bees to multiple biotic (pathogens) and abiotic (pollutants, pesticides) stressors. We have shown that low doses of fipronil and thiacloprid insecticides act in synergy with the gut parasite *Nosema ceranae* on the survival of honeybees in laboratory conditions. This project aims to better understand the impact of chemical contaminants at low dose and a widespread biotic stressor, *N. ceranae*, on the intestinal microbiota of the honeybee. We will explore the potential synergistic effects between the parasite and two other pesticides (a neonicotinoid insecticide thiamethoxam and a carboxamidic fungicide boscalid), following the kinetics of the bee response to parasite and pesticides, alone and in combination. We will monitor physiological parameters (mortality, histopathological effects on the intestinal tissue, parasite development) as well as the evolution of the gut microbiota (bacterial and fungal populations). These tests will be performed by rearing bees in laboratory cages. For the combination with the highest observed synergy, semi-field experiments will be performed on whole colonies. This approach will allow us to be closer to the natural conditions. Thus, the objectives of this project are: (i) to identify possible synergies harmful to honeybees after exposure to the combination of two pesticides (thiamethoxam and boscalid), after exposure to both combinations of pesticides / *N. ceranae*, and finally after exposure to the three stressors (thiamethoxam, boscalid and *N. ceranae*) and (ii) to assess the impact of the 3 stressors, alone or in combination, on the intestinal microbiota of the honeybee in both laboratory and semi-field conditions.



PARTNERS

UMR CNRS 6023 - Laboratoire Microorganismes: Génome et Environnement.


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PUBLICATIONS

Vidau C. *et al.*, **Journal of Invertebrate Pathology** **2014**, 121:89-96. 

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Crotti E. *et al.*, **N Biotechnol** **2013**, 30(6):716-22. 

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ELISA project received funding from the initiative **SAVE THE BEES!!!**

With the help of



Funding by the Rovaltain Foundation : 49 500€