BeeProbio3: High throughput and integrative insect model to model the interplay of **stress factors controlling host-microbiota interactions at the interface of health/disease.**

Context: Honey bees are a crucial part of Canadian agriculture through their crop pollination activities. However, over the past decade, maintaining health status of honey bee colonies is a major concern for Canadian beekeepers, who are losing up to 90% of their colonies each winter (average of 27%). Until now, homologated treatments against disease and pests relying on chemicals and antibiotics became inefficient both because of parasites / pathogens evolved resistances and their toxicity for honey bee themselves. Therefore, there is an urgent need to develop new tools to treat and prevent honeybee diseases that are both efficient and sustainable: not harmful neither for honey bee microflora nor for the environmental integrity.

These PhD project objectives are to (1) develop further **bee specific probiotic strains that improved significantly colony survival and activity in the context of harsh Canadian winters**, both in disease and healthy contexts (El Khoury et al. 2018). In parallel, the PhD student will develop (2) **new bioinformatics tools to monitor the dynamic of the gut microbiota homeostasis, characterized with both metabarcoding and shotgun metatranscriptomics**.The student will focuses in modeling the impact of stress factors that are documented to break the host-microbiota homeostasis (e.g. pesticides, miticides, antibiotics, nutrient deficiencies) using network based and machine learning analysis methods to build prediction models.

The PhD candidate will have the invaluable opportunity to closely interact with specialists in apidology, molecular evolution, host-microbiota systems, metagenomics and bioinformaticians working on sister projects, including different host models (insects, Vertebrates, including zebrafish).

Qualifications and Requirements
1. Relevant background in Molecular Evolution, Ecology, Molecular Biology, Biochemistry or Cell Biology with related laboratory experience.
2. Basic molecular techniques such as bacterial culture, PCR, sequencing library preparation.
3. Background in bioinformatics (phylogeny, population genetics, genomics, metagenomics), insect and bacteria manipulation will be considered an asset.
4. Excellent written/verbal communication skills and organizational skills.
5. Demonstrated ability to work in a team environment.

Salary
20 000$/year, 3 years
Application Procedures
To apply for this position, please forward a current CV, a covering letter and two support letters via e-mail to Nicolas DEROME nicolas.derome@bio.ulaval.ca by **August 31, 2019**.

Nicolas Derome, PhD

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