Offre de stage	**Stagiaire** **« *BeeToxLandscape* - Influence of landscape and pesticide contamination on bee health: an intercontinental project»**
Période du stage	**Stage conventionné de 6 mois, à temps plein** **A pourvoir dès que possible**
Localisation	**Maisons-Alfort (94700)**

L'AGENCE

L'Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (Anses) assure des missions de veille, d'expertise, de recherche et de référence sur un large champ couvrant la santé humaine, la santé et le bien-être animal, et la santé végétale. Elle offre une lecture transversale des questions sanitaires et appréhende ainsi, de manière globale, les expositions auxquelles l'Homme peut être soumis à travers ses modes de vie et de consommation ou les caractéristiques de son environnement, y compris professionnel.

L'Anses informe les autorités compétentes, répond à leurs demandes d'expertise. L'Agence exerce ses missions en étroite relation avec ses homologues européens.

L'Anses en chiffres

- 1350 agents et 800 experts extérieurs
- Budget annuel : 132 millions d'euros
- Plus de 13 800 avis émis depuis 1999
- 65 mandats de référence nationale
- 6 millions d'euros/an en soutien aux appels à projets de recherche

Pour en savoir plus : www.anses.fr

DESCRIPTION DU STAGE

Entité d'accueil

Anses-Alfort, Laboratoire de Santé Animale, Unité d'épidémiologie; 14 rue Pierre et Marie Curie; 94701 Maisons-Alfort Cedex.
Les laboratoires de l'Anses conduisent de nombreuses activités dans le domaine de la surveillance épidémiologique : appui scientifique et technique aux activités de surveillance, développement de méthodes et d'outils dédiés à la surveillance, production de données de surveillance, analyse et interprétation de données, veille et alerte.
L'Unité Pathologie de l'Abeille est Laboratoire National de Référence (LNR) et Laboratoire de Référence de l'Union Européenne (LRUE) pour la santé des abeilles ainsi que laboratoire de référence de l'OIE.

Stage summary

ANSES is looking for an enthusiastic student that is interested in gaining research, statistical, and risk assessment experience. You will be working together with a postdoc (Dr. Simone Tosi) and an international renowned research group (ANSES Epidemiology Unit, EU reference lab of bee health, EU and USA universities). The project aims at studying the relationship between **land and crops use** and **pesticide** exposure, toxicity, and risk (see below).

Requirements: proficiency with Microsoft Excel and Word, R® (other statistical tools are a benefit), statistical modelling, knowledge of machine learning techniques and/or spatial analysis.

Key tasks for this position will be data management, data analysis, literature review.

You will fit the position if you are reliable and accurate.

English (or Italian) language will be used on the day-to-day communication.

The master report will be ideally written in English

Background of the stage

The honeybee is a major pollinator whose ecosystem services are crucial for crop production and wild plant biodiversity. Thus, the global decline in honey bee health raises concerns about ecological impacts, including food security and human welfare. Pesticides are among the most important stressors affecting bee health and pose heightened risks when bees are exposed to multiple pesticides for extended periods.

Scientific problem

The BeeToxLandscape project aims at studying environmental pesticide contamination from a bee health perspective. The project's wider goal is to improve bee health through better understanding the environmental stresses bees face – firstly focusing on the role played by pesticides. Our aim is to understand the risk associated with field-realistic pesticide exposures, developing and using refined **risk assessment analysis**, and exploiting the availability of multiple local bee health and pesticide contamination datasets. Focusing on bee health, we will investigate the **relationship between land and crops use and pesticide exposure, toxicity, and risk**.

Specifically, we will use a dataset of pesticide exposure data (~1000 pesticide samples = ~1000 lines) associated with **spatial information** (~200 land and crop uses = ~200 columns) across time (2011-2017) to investigate associations between pesticide exposure and risk and land use. The dataset has also additional information on disease and management practices (~20 columns related to diseases and management). The dataset is of extremely **high value and originality**, derived from an established survey system that collected data over multiple years. All the necessary data is available, and the dataset is large enough to **implement statistical methods**.

Collaborations with supervisors and project partners will provide **additional support** (statistical analysis, literature review, interpretation of data, etc).

Overall tasks and objectives

1. Bibliographic **review** on bee health monitoring projects (e.g. involving landscape data), pesticide toxicity and use;
2. **Data management** of bee health, pesticide exposure, and landscape datasets obtained by multiple project partners worldwide;
3. **Statistical analysis** of datasets with bee health, pesticide exposure and risk, and landscape info
   a. Identify and describe pesticide exposures and risks in relation to land uses and crops, build and evaluate a statistical **model** (using classical statistical modelling methods and/or machine learning techniques) of the relationship between risk and land use
   b. Use and create **risk maps** and **cluster analysis**

   ANSES Epidemiology Unit and international partner(s) will train and **support** the student.
4. Contribute to **novel interpretations** of pesticide risks, involving spatial analysis. International collaborations will facilitate this aim.
5. Contribution and involvement as author in **scientific research papers**.

PROFIL RECHERCHÉ

Diplôme en cours	Master 2 in biostatistics/statistics, or in ecology with a strong data analysis background, or equivalent.
Main software used	R®, Microsoft Office Suite (Excel, Word, Power Point), reference manager (EndNote, or Mendeley, etc)
Topics of the stage	Statistics (spatial analysis, machine learning), ecology, pollinator and environmental health.

POUR POSTULER

Date limite de réponse : 23/12/2019

Renseignements sur le stage :

Stage start date: as soon as possible, ideally January or February 2020. The internship position will expire as soon as a student is selected, so we suggest applying as early as possible.
Stage duration: 6 months
Funding: 554€ / month

Adresser les candidatures par email (lettre de motivation + cv) **en indiquant la référence Stage-2019-001 à :**

Dr. Simone Tosi (simone.tosi@anses.fr). Attach your **CV + motivation letter**, in *English*, explicitly stating your expertise in the statistical tools and other topics of the stage.
Please use as object of the email: Stage-2020-01