PhD POSITION 2019 -2022

Impact of landscape structure and farming practices on level of pest infestation and pesticide use in perennial cropping systems

Project description: There is a strong need to limit the negative impacts of farming systems on the environment and more generally to increase durability of agroecosystems. Reduction of pesticide use in farming systems is a major issue and especially in perennial cropping systems, such as viticulture and arboriculture, that have very high levels of pesticide use (from 10 to 40 treatment annually). Despite the urgent need to reduce pesticide use in such systems, the relative effects of environmental drivers of pest infestation levels and pesticide use remains largely unknown.

The goal of this PhD thesis is to investigate the explanatory power of several environmental variables on levels of pest infestation (insects and pathogens) and pesticide use in viticulture and arboriculture at the French national scale. The successful candidate will particularly investigate how landscape structure (considering farming practices and semi-natural habitats) affects pest infestation levels and the temporal dynamics in pesticide use. On the one hand and for some pest species (e.g., insects), we hypothesize that decreasing pesticide use in the landscape may improve pest regulation by their natural enemies due to lower negative effects of pesticides on natural enemy populations. On the other hand, for other pest species (e.g., pathogens) decreasing pesticide use may increase the overall pest pressure in the landscape. This project will allow classifying the biotic and abiotic drivers of pest infestation levels based on their importance and therefore will guide the development of agroecological pest management strategies tailored to local contexts. The successful candidate will benefit from databases about pest infestation levels, farming practices and land use collected at multiple spatial scales (from regional to national).

Qualifications: We are looking for motivated candidates with a Master degree (or equivalent) in ecology, agronomy or statistics. Very good skills in data analyses (using R) are required. Skills and experience in data management and GIS are welcome. Interest and knowledge about agriculture is an advantage but is not required. The candidate is expected to have interest for interdisciplinary approaches and to be able to work independently as well as in a team.

Supervisors and place of work:
The supervisors of the successful candidate will be: Claire Lavigne (PSH), Pierre Franck (PSH) and Adrien Rusch (SAVE). The research will be carried out at Avignon (UR INRA PSH) but with possible short/long stays in Bordeaux (UMR SAVE).

Send your electronic applications (CV, letter of motivation, name and contact of two referees, relevant certificates) to: adrien.rusch@inra.fr and pierre.franck@inra.fr Cc to claire.lavigne@inra.fr
Deadline to send applications: 21/06/2019
Starting date: 01/10/2019
Labs: UR INRA Plantes et Systèmes de culture Horticoles (PSH), Agroparc, Avignon;
https://www6.paca.inra.fr/psh
UMR Santé et Agroécologie du VignoblE (UMR SAVE), Villenave d'Ornon
https://www6.bordeaux-aquitaine.inra.fr/sante-agroecologie-vignoble