Proposition de stage M2 (2024) – Master 2 internship

Earthworm communities in agroecological cropping systems to characterize soil multifunctionality

Keywords: Cropping systems; Earthworms; Agricultural practices; Flower strips.

Illustration picture

Hosting structure

UMR 1114 EMMAH INRAE-Avignon Université, Avignon, France

Supervisor contact details

Céline PELOSI (celine.pelosi@inrae.fr)

Internship dates (start and end)

from January (or later) to June (or later) 2024

Internship proposal description

Context:

Reducing environmental pressures, preserving resources and maintaining qualitative and quantitative agricultural production constitute the challenges of agroecology. This involves developing agricultural practices favorable to soil biodiversity, adapted to the ecological complexity of systems and relying on ecological processes to support production while considering the variability of soils and their functioning. In this context, it is important to design and evaluate innovative practices and agricultural systems that have made an agroecological transition.

In this project, we will assess the effects of 4 innovative cropping systems which cross direct-drilling vs ploughing, N-fertilization or not and permanent vs rotational crops. All the cropping systems in the experimental site implemented in 2018 at Epoisses (INRAE) are conducted without pesticides, by promoting and mobilizing cultivated and wild biodiversity, together with a set of practices, to ensure services for regulating bio-attackers, pollination, nutrient supply and ultimately, plant production (while limiting dis-services). During this internship, we will also assess the effects flower strips in cereal fields (near Paris) 4 years after their implementation in a set of farmer's fields differently conducted (ploughed/unploughed, organic or conventional farming, etc.).

Soils fulfill multiple functions which depend on the types of soil and occupation, this is the concept of multifunctionality of soils. At the interface between processes and services, studying the multifunctionality of soils then takes a very important place in the evaluation of agroecosystems. A major component of soil multifunctionality is its ability to be a habitat for organisms and to regulate biodiversity. Among soil biodiversity, earthworms represent a large proportion of living biomass and they are involved in key soil functions and ecosystem services (Blouin et al., 2013). In this project, we will use earthworm communities as an element to assess soil multifunctionality in agroecological cropping systems.

Scientific objectives:
Based on earthworm communities collected *in natura*, in agricultural fields conducted experimentally (Epoisses) or by farmers (near Paris), we will answer the following question: do agroecological practices and cropping systems improve earthworm communities?

Implementation terms (techniques, work to be done, workflow, etc.):
The internship will be conducted based on field sampling at Epoisses and near Paris. We will sample earthworms in March and April and the sampled individuals will be identified at the species level. Information on agricultural practices in the different fields will be gathered for results interpretation.

The internship will be paid according to the French regulations.

Desired skills:
Master 2 student or last year of engineer school, with background knowledge in **agroecology and/or soil ecology**. Ability to manipulate safely animals, conduct rigorously field and laboratory work, and experimental testing. Skills in statistics will be necessary. Ability to read scientific publications.

HOW TO APPLY?

Please send a CV and a letter explaining your motivation to celine.pelosi@inrae.fr

Deadline for application: 10/11/2023