

**One-year post-doctoral position in agroecology
INRAE, Palaiseau, France**

***Agroecological and landscape determinants of
legume bruchid populations and their biological control***

We offer a one-year post-doctoral position to study the interactions between legume bruchids (*Bruchus spp.*) populations, their natural enemies and their agroecological context.

Seed legumes have many nutritional, agronomic and environmental advantages, but they are susceptible to bruchids pests (Coleoptera: Chrysomelidae), whose larval development in the seeds severely compromises their nutritional quality and germination capacity. To date, there is no effective means of controlling lentil and faba bean bruchids even with insecticide treatments. Improved management of bruchid populations could encourage greater adoption of legume crops by farmers. An agroecological management of bruchids pest requires a systemic and preventive approach based on a better understanding of complex interactions between pest dynamics, natural pest control, agricultural practices and landscape determinants.

Elucidating these interactions is a prerequisite for developing an appropriate strategy that incorporates all the relevant spatial and temporal scales, in order to reduce the risk of damage from these pests. A previous project has already collected a large amount of data from farmers' fields in three production basins in France over three successive seasons (2020-2022, n=110 fields in total) and for two legume crops (faba bean and lentils). These data comprise bruchid pest abundance and dynamics, percentage of parasitized larvae, damage and yield measurements, technical operations in the field, vegetation survey around fields and landscape description. The aim of the post-doctoral researcher is therefore to conduct a full analysis of the data and compare the two crop cases.

Based on the case study of grain legume bruchids, the post-doctorate will address the following research question: how does biodiversity at different scales (in the field, its surroundings and the landscape), in interaction with local practices and landscape dynamics, affect pest populations, their damage and their regulation by parasitoids?

More specifically, the person recruited will be responsible of:

- Calculating multi-scale landscape variables and functional variables describing resources and habitats for bruchids and for parasitoids;
- Exploring the data using multivariate analyses to select the most relevant explanatory variables;
- Carrying out statistical modelling using linear mixed models to link the three main variables to be explained (abundance of bruchids, amount of damage and rate of parasitism) to all the explanatory variables selected;
- Conceptual modelling (using structural equation models or PLS-PM) of the relationships between pest pressure, damage, regulation by parasitism and agronomic, ecological and landscape components;
- Publishing these results in one or two scientific articles.

The successful candidate will be based in INRAE '[Agronomy](#)' laboratory in Palaiseau (near Paris, France) and will interact closely with the [AGIR](#) (Toulouse) and [IGEPP](#) (Angers) laboratories.

The aim of the 'Agronomy' laboratory is to produce and mobilise scientific and expert methods and knowledge, from local to global scales, to (i) assess the environmental impacts and ecosystem services provided by current and alternative cropping systems, and (ii) support stakeholders involved in changing agricultural techniques by working with them to develop resources (knowledge, tools and methods).

Knowledge required

- A research experience in systemic agronomy, agroecology, landscape ecology or biodiversity research;
- Fluency in R and understanding of advanced statistical techniques, including analysis of multi-relational datasets and variables with multifactorial determinants;
- Excellent written and oral communication skills and the ability to collaborate effectively within a diverse team of researchers;
- A good publication record and the ambition and capacity to publish in peer-reviewed journals.

Appreciated experience

- Experience in the use of GIS software;
- Knowledge in entomology, in plant functional ecology.

Form of employment

Full-time employment for one year. Salary will be in line with INRAE standards (gross monthly salary ranging from 2600 to 3200€ depending on previous experience).

Starting date: 1st October 2024

Location

INRAE, UMR Agronomie
22, place de l'agronomie
91123 Palaiseau, France
<https://eng-agronomie.versailles-grignon.hub.inrae.fr/>

Application

Applications must be sent no later than **30th June 2024** to antoine.gardarin@inrae.fr, laurent.bedoussac@inrae.fr and yann.tricault@agrocampus-ouest.fr

Applications should be written in English and contain (i) a statement of academic interests and motivation for the position, (ii) a Curriculum Vitae including a complete list of publications and (iii) a letter of recommendation for the position, which the referee will send to us directly by e-mail.

INRAE presentation

The French National Research Institute for Agriculture, Food, and Environment (INRAE) is a major player in research and innovation. It is a community of 12 000 people with 272 research, experimental research, and support units located in 18 regional centres throughout France. Internationally, INRAE is among the top research organisations in the agricultural and food sciences, plant and animal sciences, as well as in ecology and environmental science. It is the world's leading research organisation specialising in agriculture, food and the environment. INRAE's goal is to be a key player in the transitions necessary to address major global challenges. Faced with a growing world population, climate change, resource scarcity, and declining biodiversity, the Institute has a major role to play in building solutions and supporting the necessary acceleration of agricultural, food and environmental transitions.

INRAE's life quality

By joining our teams, you will benefit from (depending on the type and duration of the contract):

- Up to 30 days' annual leave;
- Support for parenthood;
- Skills development schemes: training, career development advice, etc;
- Social support: advice and listening, social assistance and loans;
- Holiday and leisure services: holiday vouchers, accommodation at preferential rates, etc;
- Sports and cultural activities;
- Collective catering.