

36-month Postdoctoral position: Risk-based surveillance strategies for early detection of Japanese beetle in Europe

Funding: European H2020 project *IPM-Popillia: Integrated Pest Management of the invasive Japanese Beetle*

Starting date: 1st of October 2020 (with possible adjustments)

Context

The European project IPM-Popillia addresses the challenge of a new risk to plant health in Europe, the invasion of the Japanese beetle, *Popillia japonica*. This pest was introduced accidentally to mainland Europe in 2014 and threatens the entire agricultural sector, urban landscapes, and the biodiversity in invaded areas. Designing an efficient surveillance of this invasive pest is pivotal to deploy adequate containment and/or control strategies.

About the position

The postdoctoral fellow will focus on the conception of a risk-based surveillance strategy intended for an efficient allocation of future sampling efforts. The objective is to identify a set of lookouts that are relevant for surveillance, such as, for example, those locations where the pest is likely to be observed earlier than on a randomly chosen set of locations. For this purpose, main tasks involve:

- undertaking a comprehensive review of existing knowledge regarding the biology, the ecology and the dispersal modes of *P. japonica*
- developing an approach in line with recent studies in plant epidemiology (Parnell et al 2017; Martinetti and Soubeyrand 2019), that couple (i) risk factor analyses and (ii) risk evaluation based on current sanitary conditions and pest dynamics
- collecting and organising historical and recent geo-referenced records of presence/absence of *P. japonica* in Europe, from partner observations and from other existing databases
- evaluating risk factors explaining the presence of *P. japonica*, taking natural and artificial Japanese beetle spread into account, using a variety of machine learning algorithms and network analysis

The postdoctoral fellow will carry out the research, write scientific articles, and attend national and international scientific meetings. Strong interaction will be established with partners from scientific and technical organisations to collect the data necessary to set up the model. Furthermore, the surveillance strategies designed by the postdoctoral fellow will be used to inform stakeholders in charge of plant disease monitoring in EU, establishing a feed-back loop between scientific research and technical organisations.

Qualifications and skills required

We are searching for a candidate with strong expertise in ecology or epidemiology, and modelling (PhD degree in ecology or applied mathematics/statistics). Proficient experience and skills in R programming are required, as well as demonstrated desire and proven ability to publish in peer-reviewed journals. Skills in handling geographical information (sampling data, land-use maps, spatial climate data, etc.) would be appreciated. English proficiency is mandatory, while Italian and/or French are particularly appreciated for communication within an international working environment.

Keywords

Modelling – Epidemiology – Ecology – Machine Learning – GIS – R – Applied Mathematics – Statistics – Epidemic Surveillance – Plant Protection – Plant Disease – Entomology – Insect – Pest – Optimization – Sampling

Institutional context

The postdoctoral fellow will be physically based in the research unit IGEPP (INRAE, Rennes) with regular missions to the research unit BioSP (INRAE, Avignon). The academic supervisors are Dr. Sylvain Poggi (Rennes) and Dr. Davide Martinetti (Avignon).

Duration and start date: 3 years, starting 1st of October 2020 (with possible adjustments)

Salary: **net** monthly income ca. 1900€-2000€ depending on experience

How to apply?

The application must include:

- Application letter, explaining how the candidate fits the announced position
- CV with education, positions, exam ranks, and list of publications
- 2 letters of recommendation
- University transcripts if available.

Review of applications will start on July 30th, 2020 and continue until the postdoctoral position is filled.

Contacts: sylvain.poggi@inrae.fr (INRAE IGEPP, Rennes), davide.martinetti@inrae.fr (INRAE BioSP, Avignon).

References

Parnell, S., van den Bosch, F., Gottwald, T., Gilligan, C.A., 2017. Surveillance to Inform Control of Emerging Plant Diseases: An Epidemiological Perspective. *Annual Review of Phytopathology* 55, 591–610.

Martinetti, D., Soubeyrand, S., 2019. Identifying Lookouts for Epidemio-Surveillance: Application to the Emergence of *Xylella fastidiosa* in France. *Phytopathology* 109, 265–276.