



**HAL**  
open science

## Wanted egg parasitoids: *Ooctonus vulgatus* parasitizes *Philaenus spumarius* in Corsica and is probably widely distributed in Europe

Xavier Mesmin, Marguerite Chartois, Guénaëlle Genson, Jean-Pierre Rossi, Astrid Cruaud, Jean-Yves Rasplus

### ► To cite this version:

Xavier Mesmin, Marguerite Chartois, Guénaëlle Genson, Jean-Pierre Rossi, Astrid Cruaud, et al.. Wanted egg parasitoids: *Ooctonus vulgatus* parasitizes *Philaenus spumarius* in Corsica and is probably widely distributed in Europe. 3rd European conference on *Xylella fastidiosa* and XF-ACTORS and final meeting, Apr 2021, Online Event, France. , 10.5281/zenodo.4680103 . hal-03844595

**HAL Id: hal-03844595**

**<https://hal.inrae.fr/hal-03844595>**

Submitted on 16 Nov 2022

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License



**INRAE**



3<sup>rd</sup> European Conference on  
*Xylella fastidiosa* and XF-ACTORS final meeting

# Wanted egg parasitoids: *Ooctonus vulgatus* parasitizes *Philaenus spumarius* in Corsica and is probably widely distributed in Europe

Mesmin X.; Chartois M.; Genson G.; Rossi J.-P.; Cruaud A.; Rasplus J.-Y  
CBGP, INRAE, CIRAD, IRD, Montpellier SupAgro, Univ Montpellier,  
Montpellier, France



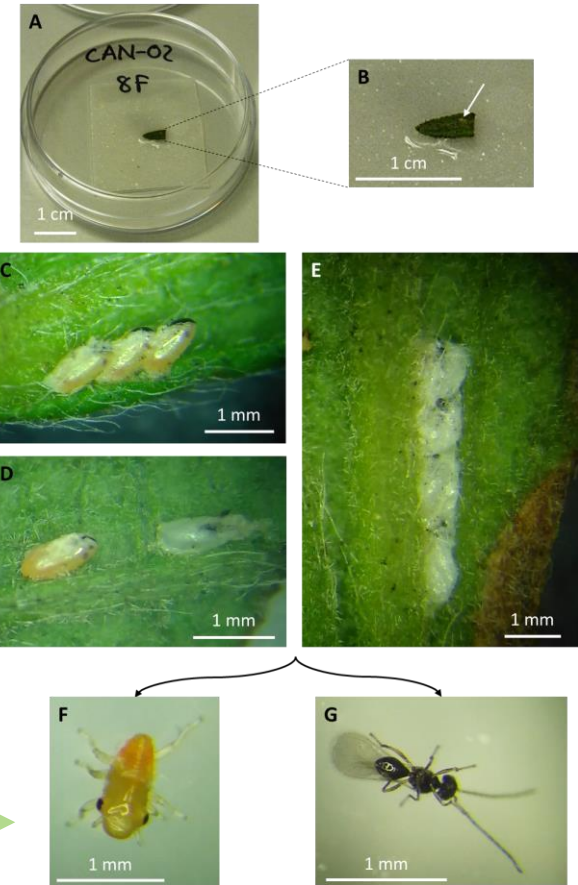
# INTRODUCTION – MATERIALS & METHODS

Although this research field has been overlooked, **vector biological control** could be an interesting environmentally friendly lever to help **lower vector density**. Ultimately, it could slow down *Xylella fastidiosa* propagation.

## M&M

- 5-10 handfuls of 8 **top branches of *Cistus monspeliensis*** collected per site.
- Sample collection in **Corsica** in early **February**.
- **2019** (4 sites) and **2020** (5 sites), total of **1107 eggs**.
- Leaf cuttings with ***P. spumarius* eggs** set on moistened filter paper inside Petri dishes (Fig. 1).
- Daily monitoring of **insect emergence**.

Fig.1 Illustration of the hatching experiment set to identify emerging insects and quantify parasitism rates of *Philaenus spumarius*



# OOCTONUS VULGATUS PARASITIZES PHILAENUS SPUMARIUS WITH VARIABLE PARASITISM RATES THROUGHOUT CORSICA

**Morphological and molecular identifications** converge on:  
*Ooctonus vulgatus* Haliday, 1833  
 (Hymenoptera, Mymaridae)

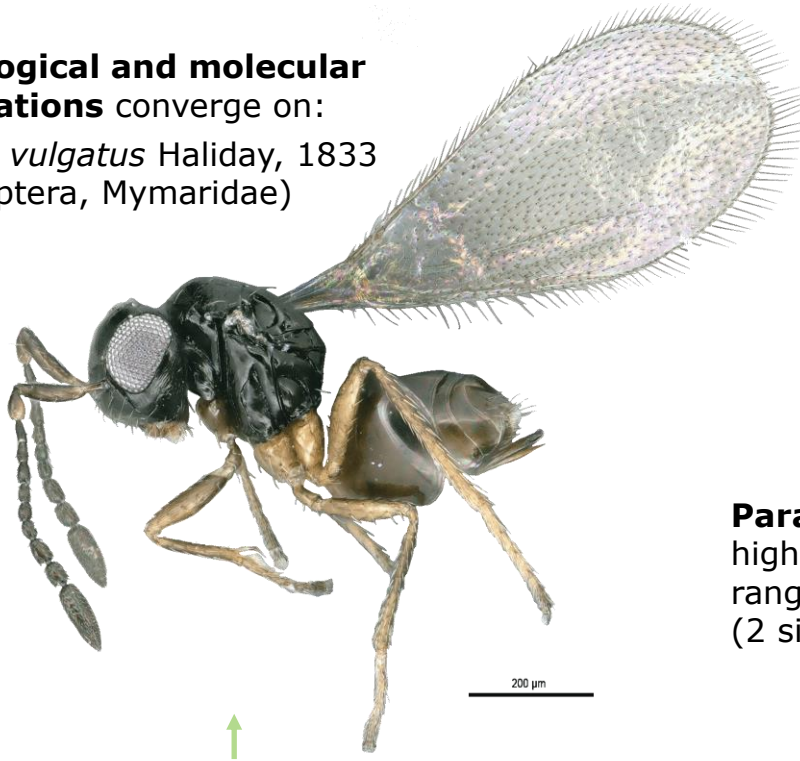
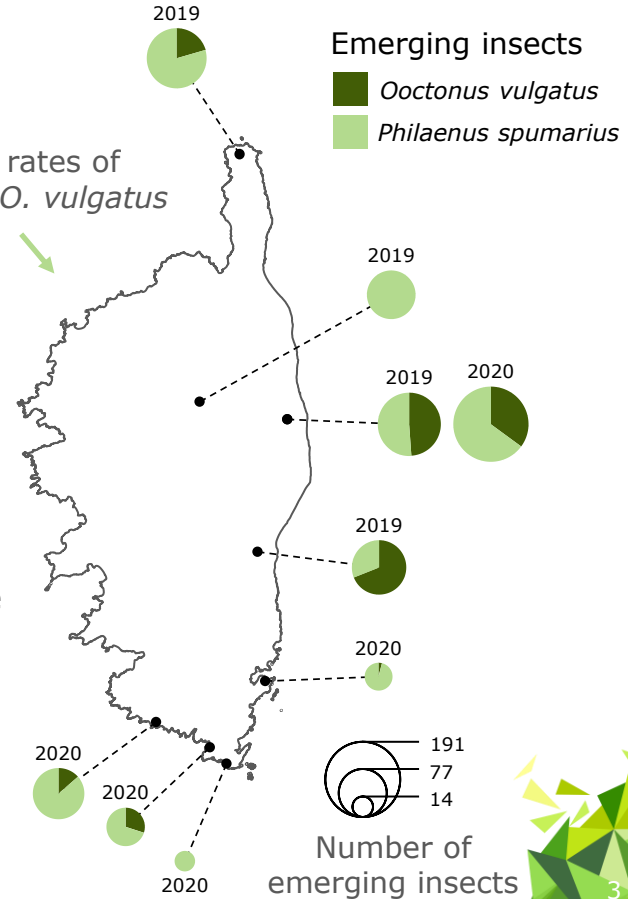


Fig. 2 *Ooctonus vulgatus*, habitus

Fig. 3 Parasitism rates of *P. spumarius* by *O. vulgatus*

**Parasitism rates** are highly variable and range from 0 % (2 sites) to 69 %



# SPECIES DISTRIBUTION MODELS PREDICT THAT THE PARASITOID IS WIDELY DISTRIBUTED IN EUROPE

## M&M

Species distribution models fitted on all available occurrences of *O. vulgatus* (Fig. 4) to **predict habitat suitability of this parasitoid in Europe.**

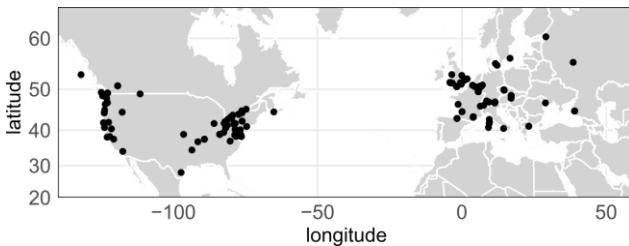


Fig. 4 Occurrences of *O. vulgatus* used to predict habitat suitability

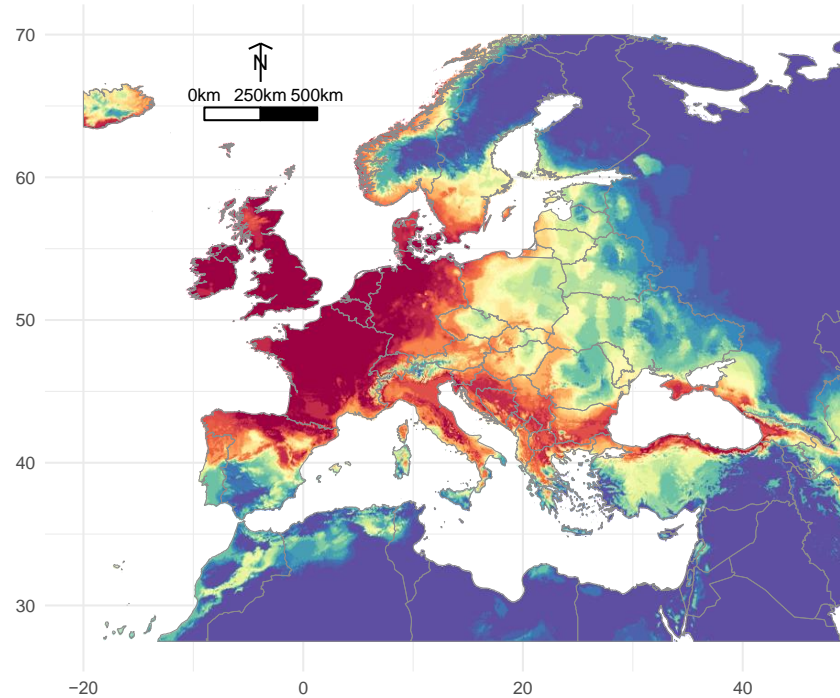


Fig.5 Predicted habitat suitability of *O. vulgatus* in Europe

Proportion of models predicting *O. vulgatus* presence (%)

0 25 50 75 100

- *O. vulgatus* occurs or is likely to occur in **many EU regions where *P. spumarius* also occurs** (Fig. 5).
- **Mass release could increase natural parasitism rates** of eggs of *P. spumarius*.

# EGG PARASITOIDS ARE PROMISING BIOCONTROL AGENTS

- Known *P. spumarius* natural enemies include **egg parasitoids**, **adult parasitoids**<sup>1</sup> and **adult predators**<sup>2</sup>
- Egg parasitoids have a unique combination of features that probably makes them promising biocontrol agents for **inundative vector control**:

They kill the pest **before the adult stage**



**Short term effect** on vectors (and on *Xf* propagation if parasitism is massive) are expected

Host **eggs** are **immobile**



Inundative release can be **restricted to egg laying sites** which increases practical feasibility and reduces costs

Egg parasitoids usually exhibit a **high level of specialization**



**Side effects** on the local entomofauna are **unlikely**

Provided that host specificity is confirmed and that mass rearing is possible, *O. vulgatus* could contribute to **IPM of *P. spumarius***, and more generally, of *Xf* pathosystem

## References:

<sup>1</sup> G. Molinatto et al., *Insects*. **11**, 607 (2020)

<sup>2</sup> A. Liccardo, A. Fierro, F. Garganese, U. Picciotti, F. Porcelli, *PLOS ONE*. **15**, e0232363 (2020)

Part of the work presented in this poster is published in X. Mesmin et al., *PeerJ*. **8**, e8591 (2020).