



**HAL**  
open science

## Vectors of *Xylella fastidiosa* show pronounced habitat preferences in Corsican agricultural landscapes

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

### ► To cite this version:

Xavier Mesmin, Marguerite Chartois, Jean-Pierre Rossi, Jean-Yves Rasplus, Astrid Cruaud. Vectors of *Xylella fastidiosa* show pronounced habitat preferences in Corsican agricultural landscapes. 3rd European Conference on *Xylella fastidiosa* and XF-ACTORS final meeting, Apr 2021, Online Event, France. , 10.5281/zenodo.4680115 . hal-03845146

**HAL Id: hal-03845146**

**<https://hal.inrae.fr/hal-03845146>**

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

# Vectors of *Xylella fastidiosa* show pronounced habitat preferences in Corsican agricultural landscapes

Mesmin X.; Chartois M.; Rossi J.-P.; Rasplus J.-Y.; Cruaud A.

CBGP, INRAE, CIRAD, IRD, Montpellier SupAgro, Univ Montpellier, Montpellier, France



# INTRODUCTION – MATERIALS & METHODS

- Most insect vectors of *Xylella fastidiosa* (*Xf*) are generalists but tend to **aggregate on preferred host plants**<sup>1,2</sup>.
- Such preferences may have consequences on the **relative importance of different insect species in the transmission of *Xf* to crops**.
- We assessed the **habitat preferences of spittlebugs** on and in the vicinity of **clementine** and **olive** groves in Corsica.

## M&M

- **16 organically managed sites** were selected within a **climatically homogeneous region of Corsica** (Fig. 1).
- Spittlebugs were monitored inside and around the groves **three times a year** (April, June and October) during **two years** (2019, 2020).
- Spittlebugs were monitored **by sight** in the spring and by **sweep netting** in the summer and fall.
- **Four habitats** were monitored in each site (see next slide).

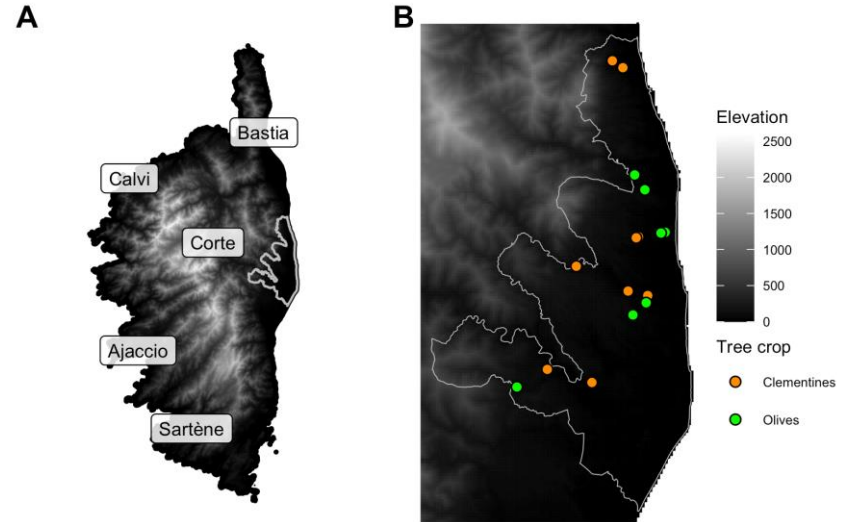


Fig.1 Sampling sites on clementine and olive groves in the eastern plain of Corsica.

# TYPE OF HABITATS INCLUDED IN THE STUDY

- On each site, the four habitats were chosen in **close vicinity** (< 500 m), so that **spittlebugs were theoretically able to shift between habitats** in a short time.
- Insect densities reflect **habitat preferences at the local scale.**



***Cistus monspeliensis* border**  
(expected preferred host of *Philaenus spumarius*<sup>3,4</sup>)



***Dittrichia viscosa* cover**  
(expected alternative host of *P. spumarius*, pers. obs.)



**Crop foliage**

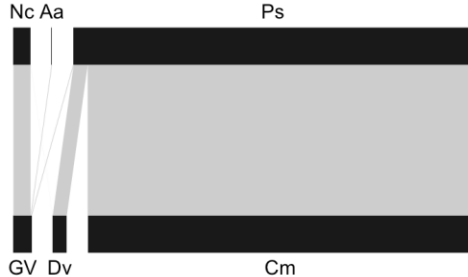
**Grove ground vegetation**

# INTERACTION NETWORKS SHOW A PREDOMINANT *P. SPUMARIUS-C. MONSPELIENSIS* INTERACTION

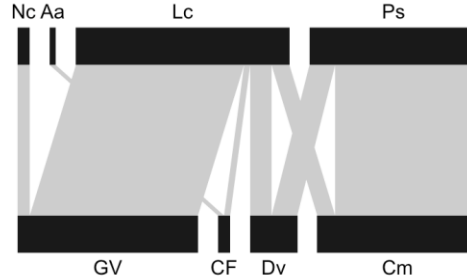
Fig. 2 Seasonal interaction networks.

Nc = *Neophilaenus campestris*, Aa = *Aphrophora alni*, Lc = *Lepyronia coleoptrata*, Ps = *Philaenus spumarius*  
 GV = ground vegetation, CF = crop foliage, Dv = *Dittrichia viscosa*, Cm = *Cistus monspeliensis*

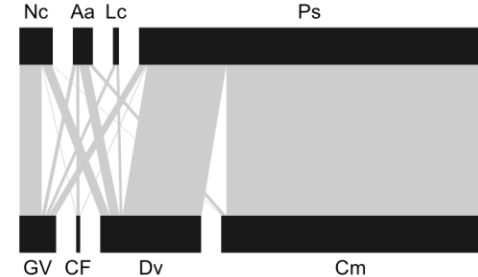
April (Ntot = 6647 spittles)



June (Ntot = 119 adults)



October (Ntot = 1595 adults)



- **Host preferences** were particularly strong in April
- **No spittlebug nymph** was found on the foliage of either olive or clementine trees.

- Few spittlebugs were collected in June and ***P. spumarius* was not predominant.**
- Only *A. alni* and *L. coleoptrata* were found on the crop foliage.

- The **most complex interaction network** was obtained in October.
- The interaction ***P. spumarius-C. monspeliensis*** constituted half of this network.
- **All species but *L. coleoptrata*** were found on the **crop foliage.**



# CONSEQUENCES FOR THE MANAGEMENT OF Xf

## CONCLUSION

- ***Cistus monspeliensis*** and ***D. viscosa*** were respectively confirmed as preferred and alternative host of *P. spumarius* in Corsica. This result contrasts with published works on olive groves in Spain<sup>5</sup> and Italy<sup>6</sup>.
  - Host **preferences may vary** under **similar geographic and climatic contexts**.
- **No summer migration of *P. spumarius* to crop foliage** as reported in Italy<sup>7</sup> was recorded in Corsica. We found that the four spittlebug species have similar abundances **on the crop foliage**.
  - Provided that the four species have similar transmission efficiencies, **they may contribute similarly to Xf propagation in Corsican olive and clementine groves**.

## APPLIED PERSPECTIVES

- Managing *P. spumarius* by means of soil tillage in spring would probably be **less efficient in the Corsican context than in Italy**.
- The **management of *C. monspeliensis* borders** in the close vicinity of Corsican groves may decrease density of *P. spumarius* and thus, the threat posed to the adjacent tree crop.

### References:

<sup>1</sup> R. Karban, M. Huntzinger, *Ecology*. **99**, 2614–2616 (2018)

<sup>2</sup> A. Latini *et al.*, *Environ Sci Pollut Res*. **26**, 6503–6516 (2019)

<sup>3</sup> A. Cruaud *et al.*, *Sci. Rep.* **8** (2018)

<sup>4</sup> J. Albre *et al.*, *Bull. Entomol. Res.* **111**, 246–256 (2021)

<sup>5</sup> M. Morente *et al.*, *Insects*. **9**, 175 (2018)

<sup>6</sup> N. Bodino *et al.*, *Insects*. **11**, 130 (2020)

<sup>7</sup> D. Cornara *et al.*, *J Pest Sci.* **90**, 521–530 (2017)