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**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

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# 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).

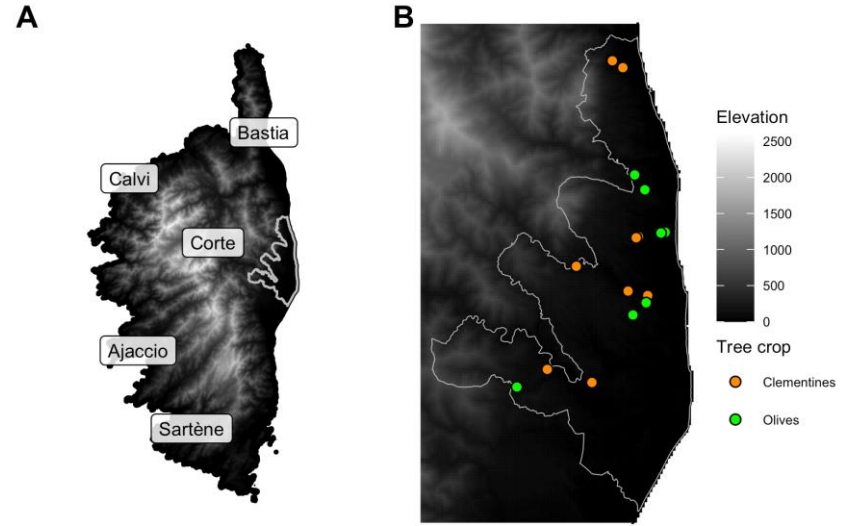


Fig.1 Sampling sites on clementine and olive groves in the eastern plain of Corsica.

# 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**

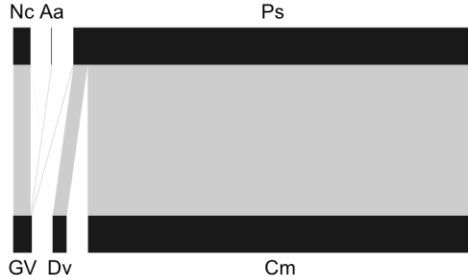
**Grove ground vegetation**

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

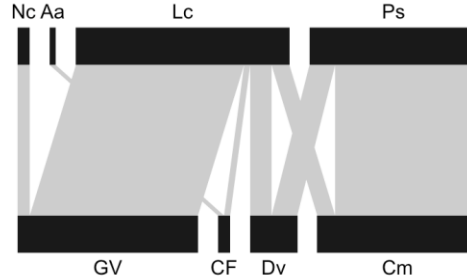
Fig. 2 Seasonal interaction networks.

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

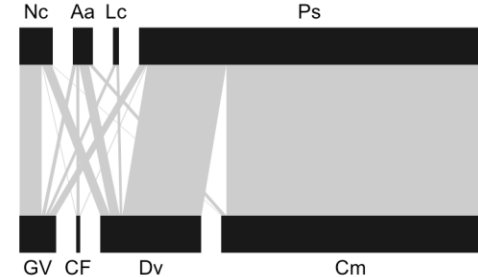
April (Ntot = 6647 spittles)



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)