Investigating the role of the meadow spittlebug (Philaenus spumarius) and its major host plant (Cistus monspeliensis) in the spread of Xylella fastidiosa in Corsica


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Investigating the role of the meadow spittlebug (*Philaenus spumarius*) and its major host plant (*Cistus monspeliensis*) in the spread of *Xylella fastidiosa* in Corsica

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Introduction

Using *Philaenus spumarius* (Hemiptera: Aphrophoridae) as a sentinel insect, we recently demonstrated that *Xylella fastidiosa* (Xf) was widely distributed throughout Corsica (Cruaud et al., 2018). During this survey, *P. spumarius* appeared to be the most abundant vector and field observations revealed that it mostly developed and fed on *Cistus monspeliensis*. We designed a large-scale survey to investigate the role of *P. spumarius* and *C. monspeliensis*, mostly asymptomatic, in the dynamics of Xf in Corsica (Fig.1).

Materials & Methods

Network of 64 experimental plots of 500m² each (Fig.2) with:

1. A density gradient in *C. monspeliensis*
2. Diverse environmental and climatic conditions with:
   a) An altitudinal gradient ranging from 0 to 600m
   b) A diversity of vegetation types ranging from shrubland, *Cistus* vegetation, low and high Maquis, to forest

Results and Discussion

**Fig.1** Schematic propagation of *Xylella fastidiosa* in the environment by *P. spumarius* & research questions

- **1.** Does C. monspeliensis density impact *P. spumarius* abundance and Xf prevalence in vector populations?
- **2.** Transmission of Xf to healthy plants
- **3.** If favourable climatic conditions for Xf
- **4.** Do climatic conditions impact development of symptoms?
- **5.** What plant species show the most severe symptoms?

**Vegetation Survey**
- *P. spumarius* Survey: Visual counting of foams or sweep netting of adults
- *P. spumarius* Sampling: Sampling in the plot vicinity to assess Xf prevalence, Xf strain, and diet.

**Xf Symptoms Survey**
- Evaluation of symptoms intensity on *Olea europaea*, *Quercus ilex*, *Myrtus communis*, *Arbutus unedo* and global vegetation

**Climate Data**
- Meteo France modelled data
- Humidity-Temperature sensors on 32 plots

*Fig.2* Network of plots

**Fig.3** First results on data from spring 2018 to summer 2019

**First results suggest that:**

- *P. spumarius* abundance increased in cool and humid habitats (Fig.3a), plants were more frequently symptomatic in hot and dry habitats (Fig.3b).
- *Olea europaea* and *A. unedo* expressed fewer symptoms than *M. communis* and *Q. ilex* (Fig.3c).
- Symptoms were particularly intense in the spring 2018 probably due to unusual drought in 2017.
- There was no significant correlation between *P. spumarius* abundance in season n-1 and frequency of symptomatic plants in season n.
- *P. spumarius* abundance increased with *C. monspeliensis* density.

**Reference cited**