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Identifying the drivers of abundance of *Philaenus spumarius* in Corsica

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INTRODUCTION

- *Philaenus spumarius* (Hemiptera: Aphrophoridae) is a major vector of *Xylella fastidiosa* in Europe, where it is widely distributed.
- However, the local climate and vegetation drivers influencing its abundance are still poorly known, in particular in semi-natural habitats.



Do the vegetation composition and temperature conditions drive *P. spumarius* abundances in semi-natural habitats in Corsica ?

MATERIAL & METHODS

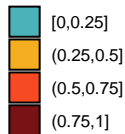
Sampling scheme

We monitored the **density of *P. spumarius* 3 times a year from 2018 to 2020 in 64 plots** distributed along **independent vegetation and altitudinal gradients** (Fig.1). The vegetation gradient was set up to account for:

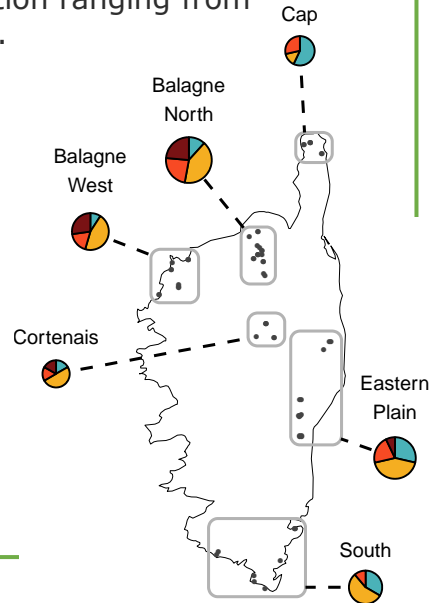
- density of *Cistus monspeliensis* on which *P. spumarius* is known to develop and feed
- structure of the vegetation ranging from shrubland to oak forest.

Fig.1 Sampling scheme

%cover by *C. monspeliensis*



number of plots/region



Data collection & Analysis

P. spumarius

visual counting of spittles or sweep netting of adults (Fig.2).

Vegetation

%cover of alive and dead *C. monspeliensis* and vegetation structure

Temperature

daily temperature retrieved from Météo France climatic models



Fig.2 Spittles of *P. spumarius* nymphs (A) and adults (B) on *C. monspeliensis*. Material (C) : sweep net and mouth aspirator.

Best temperature variables were identified with partial least squares path modelling. We used generalized linear mixed models (GLMM) to unravel the relationships between vegetation and temperature descriptors and *P. spumarius* abundance.

RESULTS & DISCUSSION

Highest *P. spumarius* abundance in scrublands

Abundance of *P. spumarius* is significantly higher in scrubland vegetation (Fig.3), where *C. monspeliensis* is frequent.

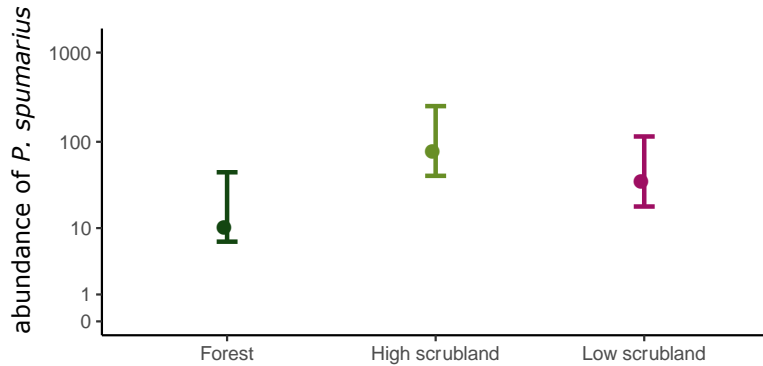


Fig.3 Abundance of *P. spumarius* by vegetation typology. Raw data and prediction with 5% confidence interval by GLMM.

Cistus monspeliensis : preferred host plant of *P. spumarius* in Corsica

Abundance of *P. spumarius* is significantly and positively correlated with *C. monspeliensis* density, which confirms difference in host plant preference between Corsica and mainland France (Fig.4).

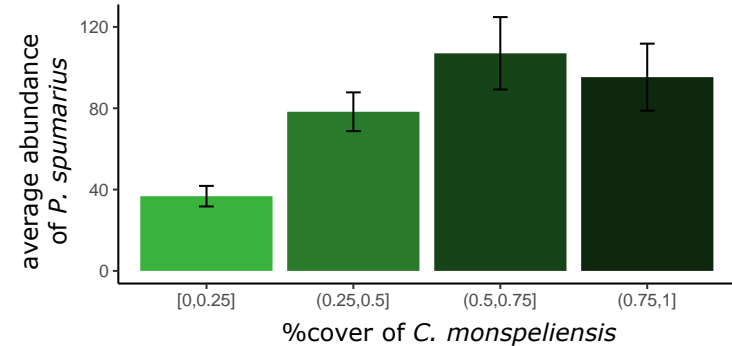


Fig.4 Average *P. spumarius* abundance by %cover of vegetation plot of *C. monspeliensis*. Error bar: standard deviation.

The **strong association between *P. spumarius* and *C. monspeliensis*** suggests that *X. fastidiosa* expansion may have been facilitated by firebreaks or disturbed habitats, where *C. monspeliensis* is abundant as an early colonizer. **Managing *C. monspeliensis* in the vicinity of agricultural areas may constitute an essential component of prophylaxis against *X. fastidiosa* in Corsica.**

RESULTS & DISCUSSION

Decreasing abundance of *P. spumarius* with higher temperature

The average temperature over the last 15 days has the highest impact on *P. spumarius* abundance, which significantly decreases with increasing temperature in June and October (Fig.5).

P. spumarius abundance decreases with higher temperature. In summer, *P. spumarius* cannot be collected even in tree foliage. **In Corsica, the role of *P. spumarius* in the transmission of *X. fastidiosa* could be reduced when temperature increases.**

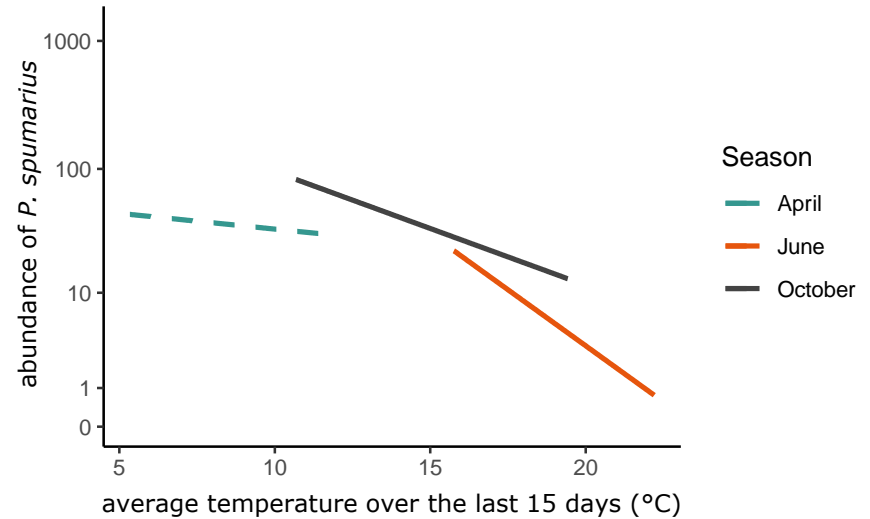


Fig.5 Relation between *P. spumarius* abundance and temperature by season. Dashed line : not significant. Raw data and regression with GLMM.