



***Philaenus spumarius* and *Neophilaenus campestris* as efficient insect vectors for *Xylella fastidiosa* in Majorca (Spain)**

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INTRODUCTION

In 2016, *Xylella fastidiosa* was detected for the first time in the Balearic Islands. In 2017, EFSA granted a project to improve the knowledge about *X. fastidiosa* vectors in the Balearics.

Objective of this study: investigate the role as vector of *Philaenus spumarius* and *Neophilaenus campestris* (Hemiptera, Aphrophoridae).

We conducted **two types of tests:**

A) A test to assess the natural infectivity of *P. spumarius* and *N. campestris*.

B) A second test to assess the vector competence of *P. spumarius*.



MATERIALS AND METHODS

Test A, adults were collected from 15/09/2020 to 19/10/2020 from areas where plants had been confirmed to be positive to *X. fastidiosa* (Xf). Field insects were kept in groups of three to five in alfalfa (*Medicago sativa* L.) for the Inoculation Access Period (IAP) (Fig. 1).



Figure 1. Set up for the IAP (96h contact) in the transmission tests A and B.

- **Test B**, 100 *P. spumarius* N2-N3 nymphs were field collected between March and April 2020 in different orchards of Majorca. Nymphs were transferred to alfalfa in groups of 25 caged in polypropylene fabric mesh cages (30x30x30) to obtain adults free of Xf. Three to five insects were put in contact with Xf positive vine plants and almond trees for the Acquisition Access Period (AAP) (Fig. 2). Then same procedure as explained for Test A was conducted.

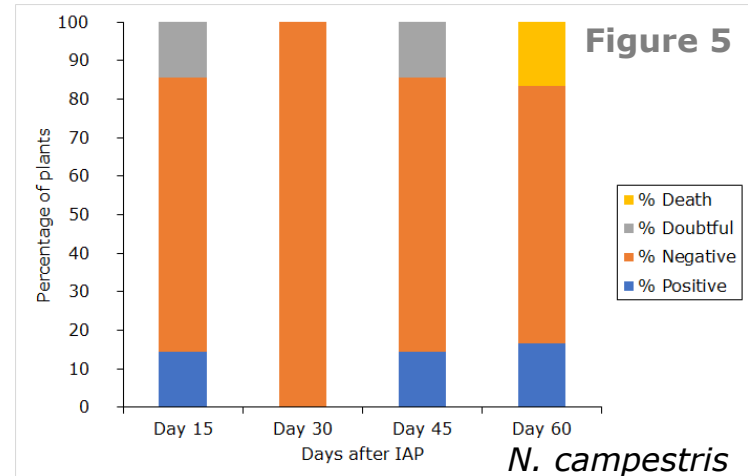
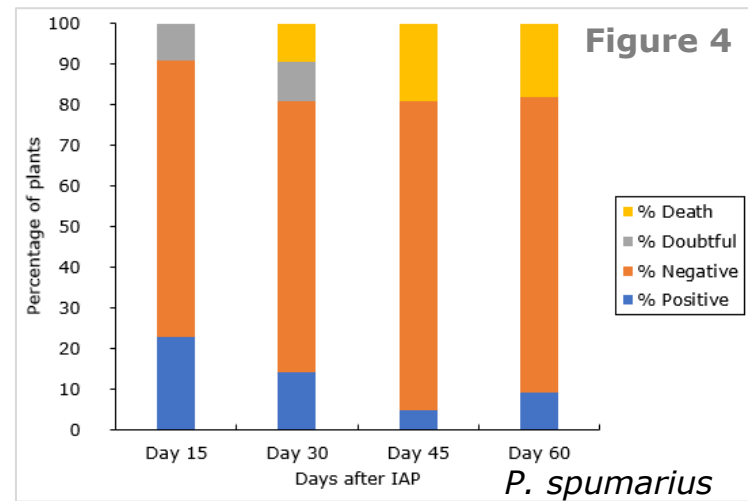
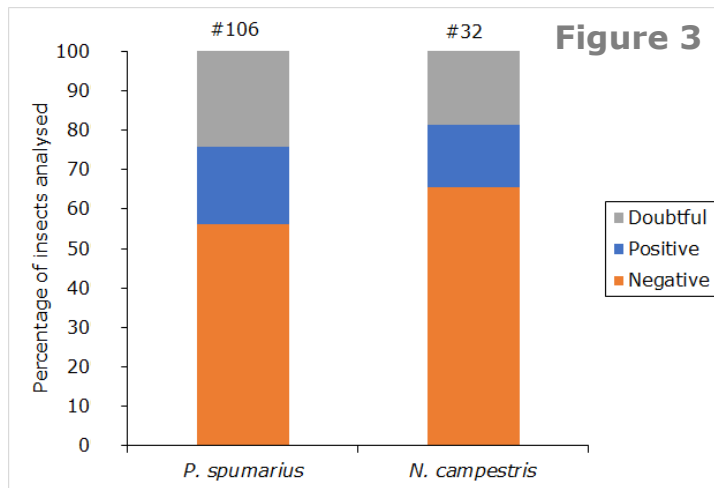
Figure 2. Set up in vine plants for the AAP (96h contact) in the transmission test B.



- In both Test, insects and plants were analysed by qPCR for the presence of Xf.

RESULTS – TEST A

- ❑ The transmission essays were set up from 15/09/2020 until 27/12/2020. A total of 150 vectors were used for transmission. From these, 106 *P. spumarius* and 32 *N. campestris* were finally analysed.
- ❑ 21.7% of *P. spumarius* and 15.6% of *N. campestris* were positive to *Xf* (Fig. 3).
- ❑ Inoculation of *Xf* to *M. sativa* by field collected insects was confirmed for *P. spumarius* (Fig. 4) and *N. campestris* (Fig. 5).



RESULTS – TEST B



Almond:

- ❑ We selected three *X. fastidiosa* positive trees.
- ❑ 13 *P. spumarius* were used for the test.
- ❑ None of these insects acquired the bacteria.



Vine:

- ❑ We selected 4 *X. fastidiosa* positive plants.
- ❑ 12 *P. spumarius* were used for the test.
- ❑ All resulted negative for *Xf*, with the exception of one insect that resulted doubtful.
- ❑ About the alfalfa plants, just the one that was in contact with the doubtful insect resulted doubtful as well to *Xf* detection 60 d after IAP.

CONCLUSIONS

- Adults of *P. spumarius* and *N. campestris* collected from *Xf* field infected areas of Majorca showed similar prevalence of *Xf*.
- Field collected adults of both species succeed in inoculating *Xf* to uninfected plants of *Medicago sativa* that were positive by qPCR 15, 30, 45 and 60 days after inoculation.
- We obtained unsuccessful acquisition of *Xf* from naturally infected plants (almond and vine) by using *Xf* free reared adults of *P. spumarius*.

