XI CONGRESO NACIONAL DE ENTOMOLOGÍA APLICADA

XVII Jornadas Científicas de la SEEA

Sociedad Española de Entomología Aplicada

Madrid, del 4 al 8 de noviembre 2019

LIBRO DE RESÚMENES

ISBN: 978-84-09-15430-2

www.congresoseea2019.com

Secretaría Técnica Congreso SEEA 2019
ALO SPAIN CONGRESS, S.L.
C/ Numáncia 73, planta 7º, puerta C-2
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PANEL 8

Abundance and diversity of potential vectors of *Xylella fastidiosa* in four different wine regions of Portugal.

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Xylella fastidiosa, is a phytopathogenic bacterium, responsible for serious diseases in important crops, such as Pierce's Disease in grapevines. The recent detection of this bacterium in Portugal is worrying, since this bacterium can spread rapidly via xylem-sap feeder insects, mainly belonging to Hemiptera Cicadomorpha. In this context, the goal of this work was to detect the abundance and diversity of possible vectors of *X. fastidiosa* in vineyards from different wine regions of Portugal. For that, in 2018, 21 vineyards with ground cover and from four different wine regions of Portugal (i.e., "Trás-os-Montes", "Vinho Verde", "Bairrada", and "Peninsula de Setúbal") were sampled for adults of Auchenorrhyncha, during three distinct periods (beginning of July, mid September and mid October). Sampling was performed in the ground and in the aerial part of the vines. In each sampling date, 10 samples of 10 sweepings were collected on the ground in each vineyard. On the aerial part of the vines, 10 samples of 50 sweepings were collected in 3 lines of the vineyard. A total of 3543 Cicadomorpha were collected on the 3 sampling dates, being the highest abundance observed in the mid September. The "Trás-os-Montes" and "Bairrada" regions, in general, presented the highest abundance of insects of this infraorder, but it was in "Vinho Verde" region that there was a highest abundance of potential vectors: *Philaenus, Neophilaenus* and *Cicadelli viridis*.

Keyword: Emerging plant diseases, grapevines, Cicadomorpha, sweepings, Pierce's Disease.

Work funded by the project H2020-SFS-2016-3. RIA, contrato 727987 "XF-ACTORS: *Xylella fastidiosa* Active Containment Through a multidisciplinary-Oriented Research Strategy".

Abundance and diversity of potential vectors of *Xylella fastidiosa* in four different wine regions of Portugal

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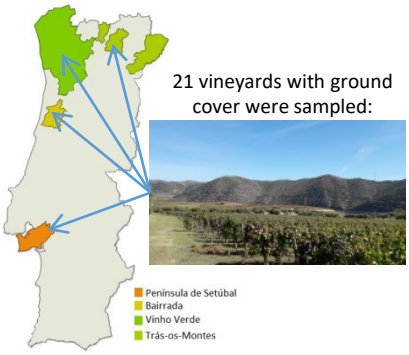
Introduction

Xylella fastidiosa is a phytopathogenic bacterium. It is responsible of serious diseases in important crops, such as Pierce's Disease in grapevines. The recent detection of this bacterium in Portugal is worrying, since this bacterium can spread rapidly via xylem-sap feeder insects, mainly belonging to Hemiptera Cicadomorpha. In this context, the goal of this work was to detect the abundance and diversity of possible vectors of *X. fastidiosa* in vineyards from different wine regions of Portugal.

Materials and Methods

In 2018:

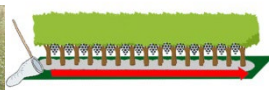


21 vineyards with ground cover were sampled:

Adults of Auchenorrhyncha, during three distinct periods:
-beginning of July;
-mid-September;
-mid-October.

Samplings was performed in:

Ground cover:



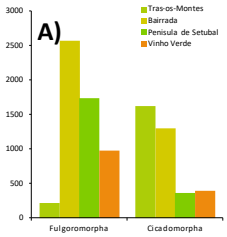
10 samples of 10 sweepings

Aerial part of the vines:

10 samples of 50 sweepings

Results

A total of 9180 adults of Auchenorrhyncha were collected in the 4 wine Portuguese regions, 5495 were Fulgoromorpha and 3685 were Cicadomorpha. The "Bairrada" region, in general, presented the highest abundance of insects of the Fulgoromorpha and Cicadomorpha infraorders (Fig 1A). Since only xylem-sap feeding insects are considered potential vectors, only the Cicadomorpha infraorder was explored further (Fig 1B). The Cicadellidae family was the most abundant in all the wine regions.



B)

		Aerial part of the vines		Ground cover		Total	
		N	Mean ± SE	N	Mean ± SE	N	Mean ± SE
Bairrada	Aphrophoridae	2	0,13 ± 0,08	9	0,30 ± 0,10	11	0,37 ± 0,12
	Cicadellidae	290	18,71 ± 9,14	997	33,23 ± 2,90	1287	42,90 ± 3,27
Península de Setúbal	Aphrophoridae	3	0,19 ± 0,11	4	0,13 ± 0,08	7	0,23 ± 0,09
	Cicadellidae	231	14,90 ± 7,33	125	4,17 ± 0,68	356	11,87 ± 1,36
Trás-os-Montes	Aphrophoridae	1	0,06 ± 0,04	6	0,20 ± 0,11	7	0,23 ± 0,11
	Cicadellidae	663	42,77 ± 21,34	955	31,83 ± 2,62	1618	53,93 ± 3,14
Vinho Verde	Aphrophoridae	0	0,00 ± 0,00	17	0,57 ± 0,16	17	0,57 ± 0,15
	Cicadellidae	57	3,68 ± 1,82	318	10,60 ± 1,70	375	12,50 ± 1,81

Fig 1. A) Total number of individuals of Cicadomorpha and Fulgoromorfa infraorders; **B)** Total abundance (N) and mean ± standard error (SE) of Aphrophoriade and Cicadellidae, in the aerial part of the vines and ground cover, in the four different wine regions.

The ground cover presented a higher abundance of individuals relative to the aerial part of the plants. In general, the highest abundance of individuals was observed in mid-September.

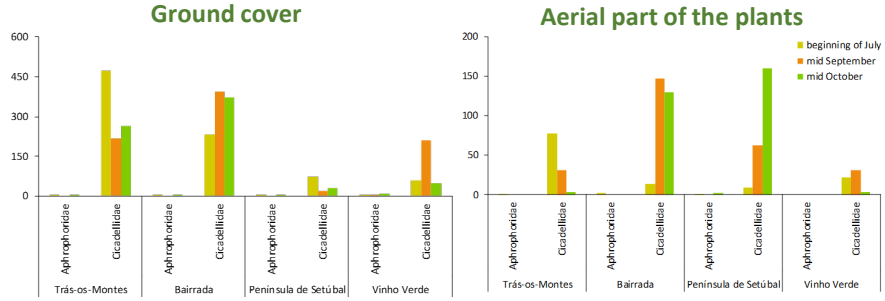


Fig 2. Total number of Aphrophoridae and Cicadellidae families in the ground cover and aerial part of the plants over time, in the four different wine regions.

The "Bairrada" and "Vinho Verde" regions presented the highest abundance of potential vectors: *Philaenus, Neophilaenus* and *Cicadelli viridis* (Fig 3.).

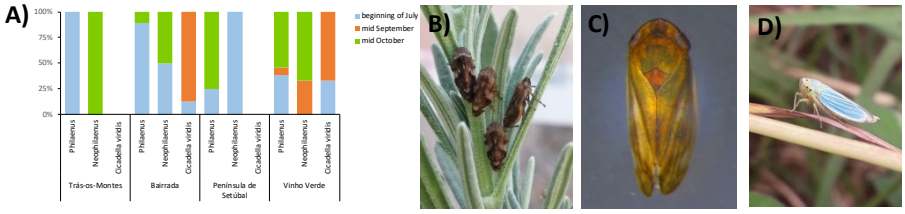


Fig 3. A) Abundance of Philaenus sp., Neophilaenus sp. and *Cicadella viridis* in the four different wine Portuguese regions, over time. **B)** Adults of Philaenus sp., **C)** Adult of Neophilaenus sp. **D)** Adult of *Cicadella viridis*

Conclusion

Since the members of the Cicadellidae family were the most abundant in all the studied wine regions in Portugal, they should be considered as the most potential vectors of Xf in these vineyards. The abundance of Cicadellidae and Aphrophoridae in each stratum (aerial part of the plant vs. ground cover) over time, was variable according to the wine region. This is probably due to the different climates, the landscape and its management.

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