



Major results and challenges of the EU H2020 POnTE project on the control of *Xylella fastidiosa*

Nov 2015- Oct 2019

Donato Boscia

CNR, Istituto per la Protezione
Sostenibile delle Piante, Bari (IT)

2nd European
conference on
*Xylella
fastidiosa*
2019



HOW RESEARCH CAN SUPPORT SOLUTIONS

Ajaccio, 29-30 October 2019

Project Consortium

25 PARTNERS
13 COUNTRIES
>120 RESEARCHERS



TARGET PATHOSYSTEMS



- *Xylella fastidiosa* (Xf) and insect vectors
- ‘*Candidatus Liberibacter solanacearum*’ (CaLsol) and psyllid vector species
- *Hymenoscyphus fraxineus* (Hf) (causal agent of ash dieback) and new and exotic *Phytophthora* (Phy) species

<https://www.ponteproject.eu/>

Ash dieback and *Phytophthora* spp.



Candidatus Liberibacter solanacearum



XYLELLA: SCENARIO AND MAIN QUESTIONS TO ADDRESS IN 2015

Large Xf outbreak linked to a novel severe olive disease



- Is Xf the causal agent?
- The local and EU vectors?
- How it spreads in olive groves?
- How to improve surveillance at EU level?
- Which areas are under threat?
- How to control the bacterium in the plants
- How to control the vectors
- How to enhance responsiveness and awareness

■ Is Xf the causal agent?

2017 Symptoms reproduced in olive, oleander and *P. myrtifolia*

www.nature.com/scientificreports

SCIENTIFIC REPORTS

OPEN

Isolation and pathogenicity of *Xylella fastidiosa* associated to the olive quick decline syndrome in southern Italy

Received: 4 May 2017

Accepted: 4 December 2017

Impact of this result?



WE HAVE A TOOL
(i) TO SCREEN CULTIVAR SUSCEPTIBILITY
(ii) TO INVESTIGATE HOST-PATHOGEN INTERACTIONS

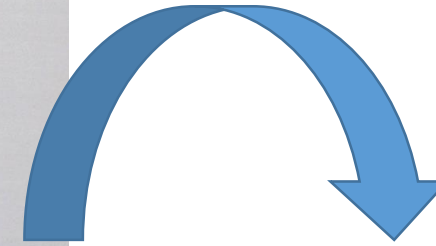
Impact of the results?



What's next?

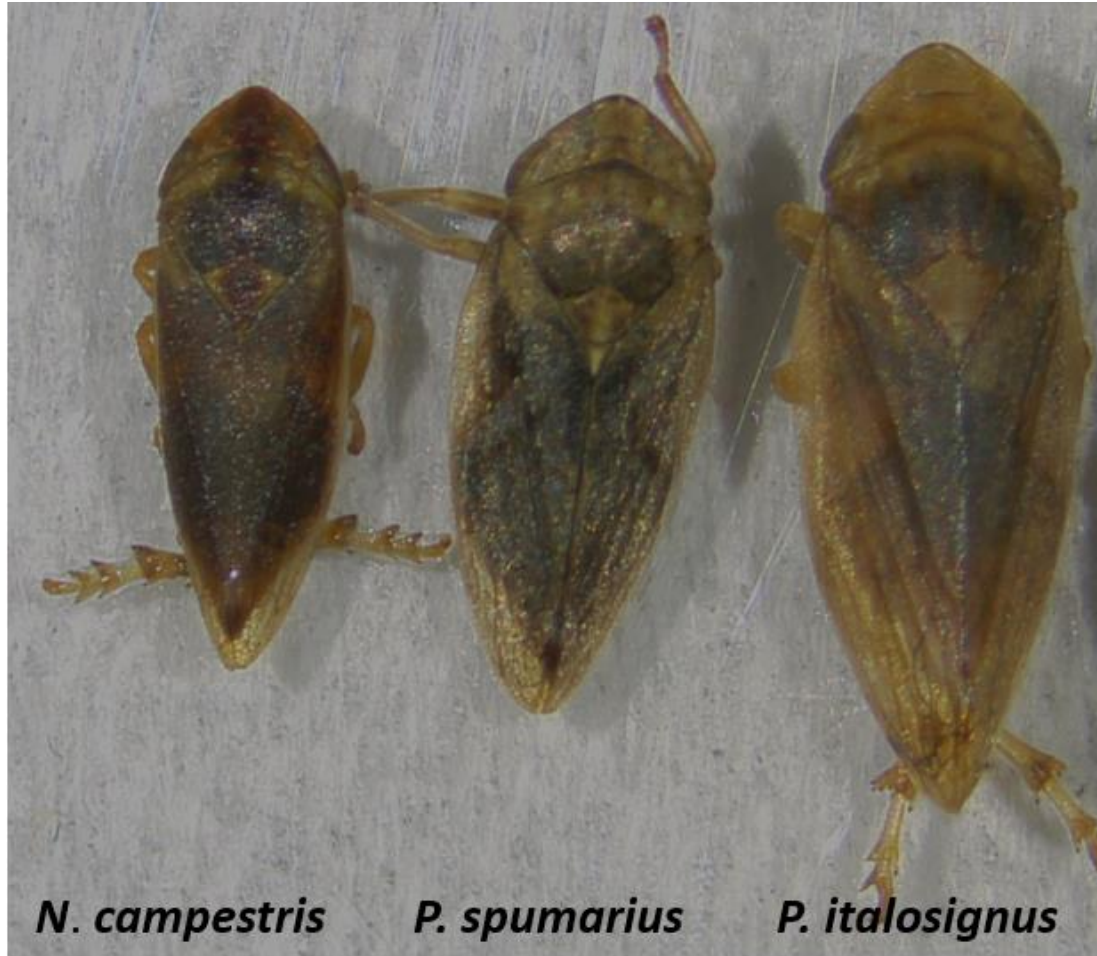


Xylella Fastidiosa Active Containment Through a
multidisciplinary-Oriented Research Strategy



- Large GH testing started
(see poster P9 - Serrano Gómez)
- Extensive transcriptomic analyses
- Identification of putative Differentially Expressed Genes - DEGs – linked to host response
- (P. Saldarelli oral presentation)

- Is Xf the causal agent?
- The local and EU vectors?



- The first EU vectors identified
 - (see posters P83,P88 – Cavalieri et al)
 - Host preference vs negative selected host plants
 - Phenology
 - Mark-Recapture experiments
- (Bosco/Bodino/Simonetto oral presentations)

Impact of the results?

- Targetted surveys in EU for spittlebugs
- Trials for the control of the vector populations
(**Dongiovanni** oral presentation)
- Experimental-based parameters to develop models for short-range spread
(**Gilioli** oral presentation)

SCIENTIFIC OPINION



ADOPTED: 28 April 2019

doi: 10.2903/j.efsa.2019.5665

Update of the Scientific Opinion on the risks to plant health posed by *Xylella fastidiosa* in the EU territory

EFSA Panel on Plant Health (PLH),

EXPLOITATION OF THE RESULTS

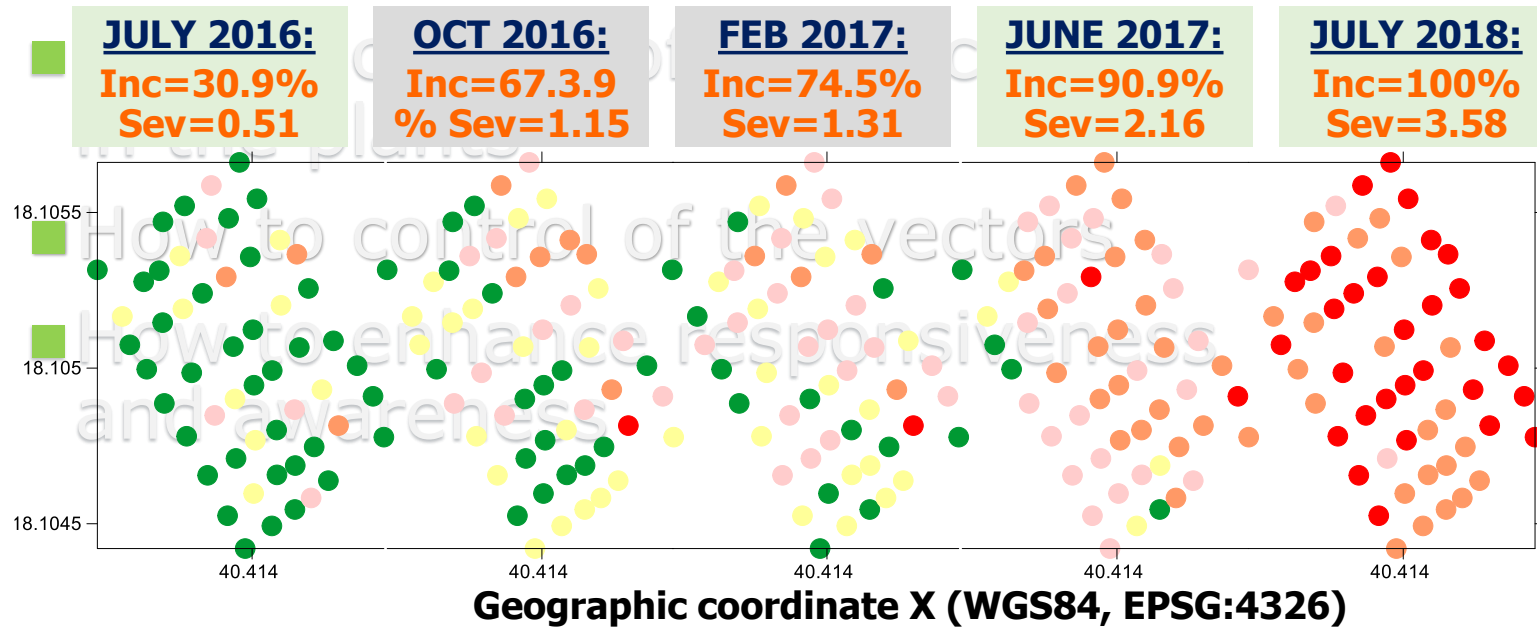
■ NEXT STEP

- Transmission characteristics (**Bodino** oral presentation)
- Insights into the transmission dynamics (**Cornara** oral presentation)

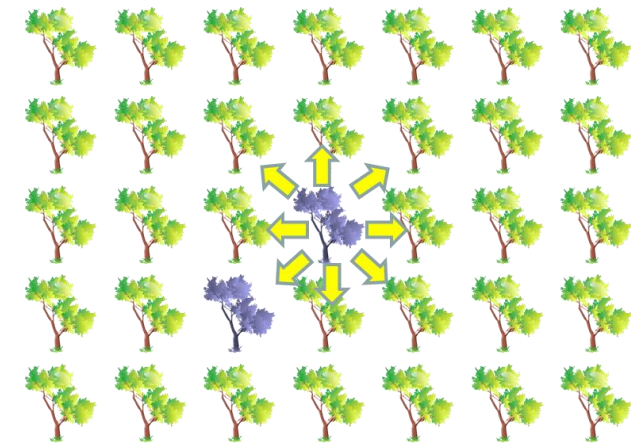


Xylella Fastidiosa Active Containment Through a
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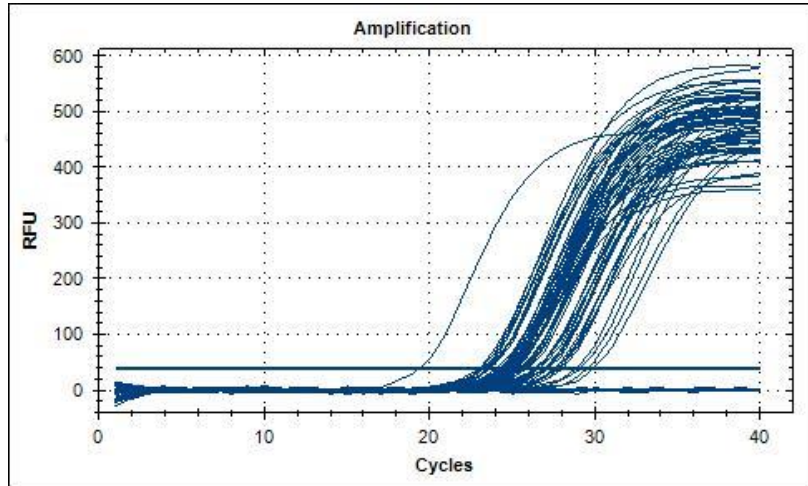
- Is Xf the causal agent?
 - The local and EU vectors?
 - How it spreads in olive groves?
 - How to improve surveillance at EU level?
 - Which areas are under threat?
- Aggregate pattern
 - Infected olives main source of inoculum



(Navas et al. unpublished)



■ How to improve surveillance at EU level?



■ Validation and Harmonization of diagnostic protocols (Poliakoff oral presentation)

■ Remote sensing

■ How to coordinate the different sectors

■ How to enhance cooperation and awareness



nature
plants

LETTERS

<https://doi.org/10.1038/s41477-018-0189-7>

Previsual symptoms of *Xylella fastidiosa* infection revealed in spectral plant-trait alterations

P. J. Zarco-Tejada^{1*}, C. Camino², P. S. A. Beck¹, R. Calderon², A. Hornero^{2,3},
R. Hernández-Clemente³, T. Kattenborn⁴, M. Montes-Borrego², L. Susca⁵, M. Morelli⁶,
V. Gonzalez-Dugo², P. R. J. North³, B. B. Landa², D. Boscia⁶, M. Saponari⁶ and J. A. Navas-Cortes²

■ How to improve surveillance at EU level?

Impact of the results?

Contributions to the three revisions of the EPPO diagnostic standards

Wiley Online Library



Diagnostic |  Free Access

PM 7/24 (4) *Xylella fastidiosa*

First published: 09 September 2019 | <https://doi.org/10.1111/epp.12575>

 SECTIONS

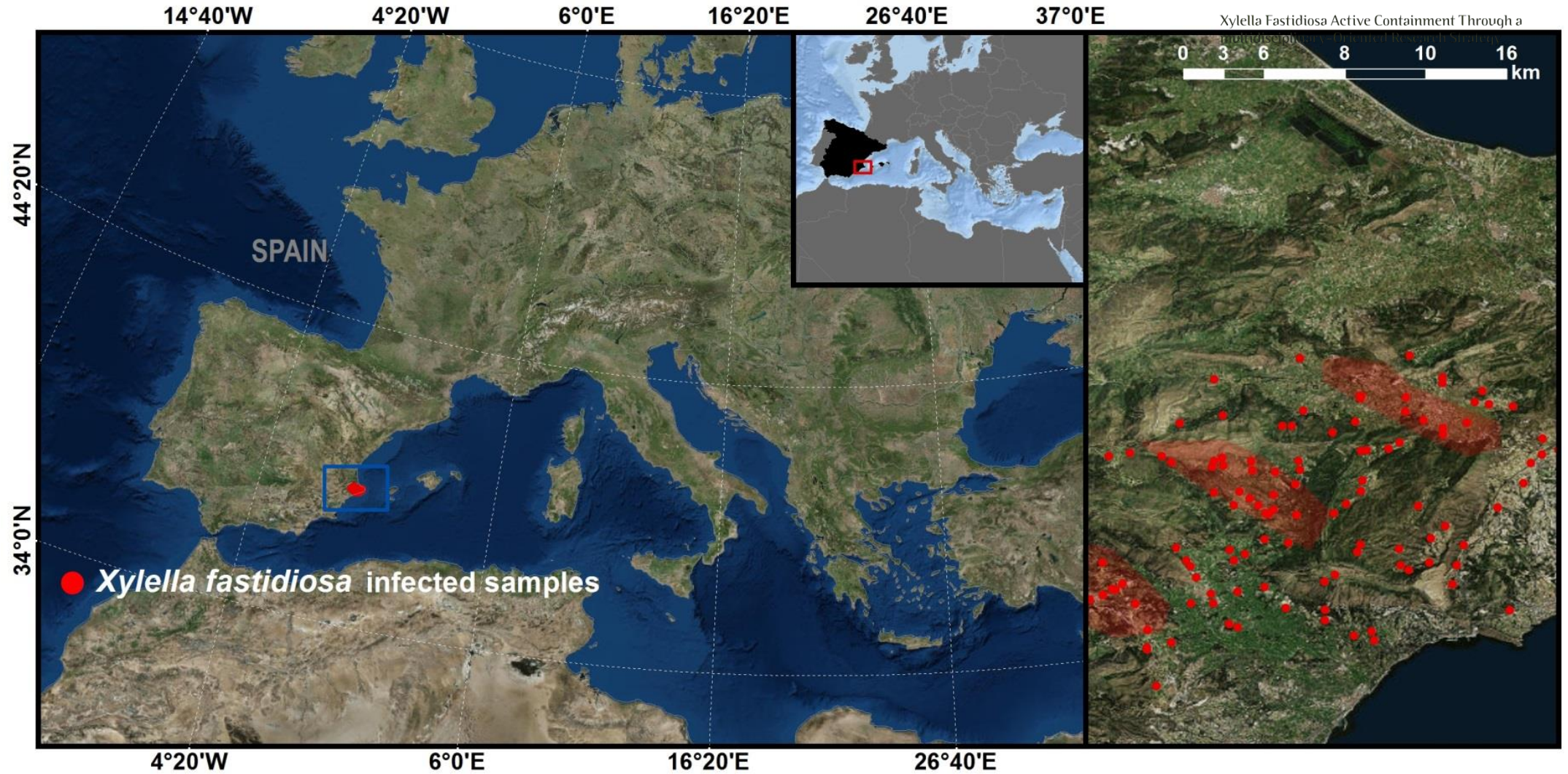
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 TOOLS

Airborne campaign in Alicante region



NEXT STEP



- Which areas are under threat?
- How to improve surveillance at EU level?

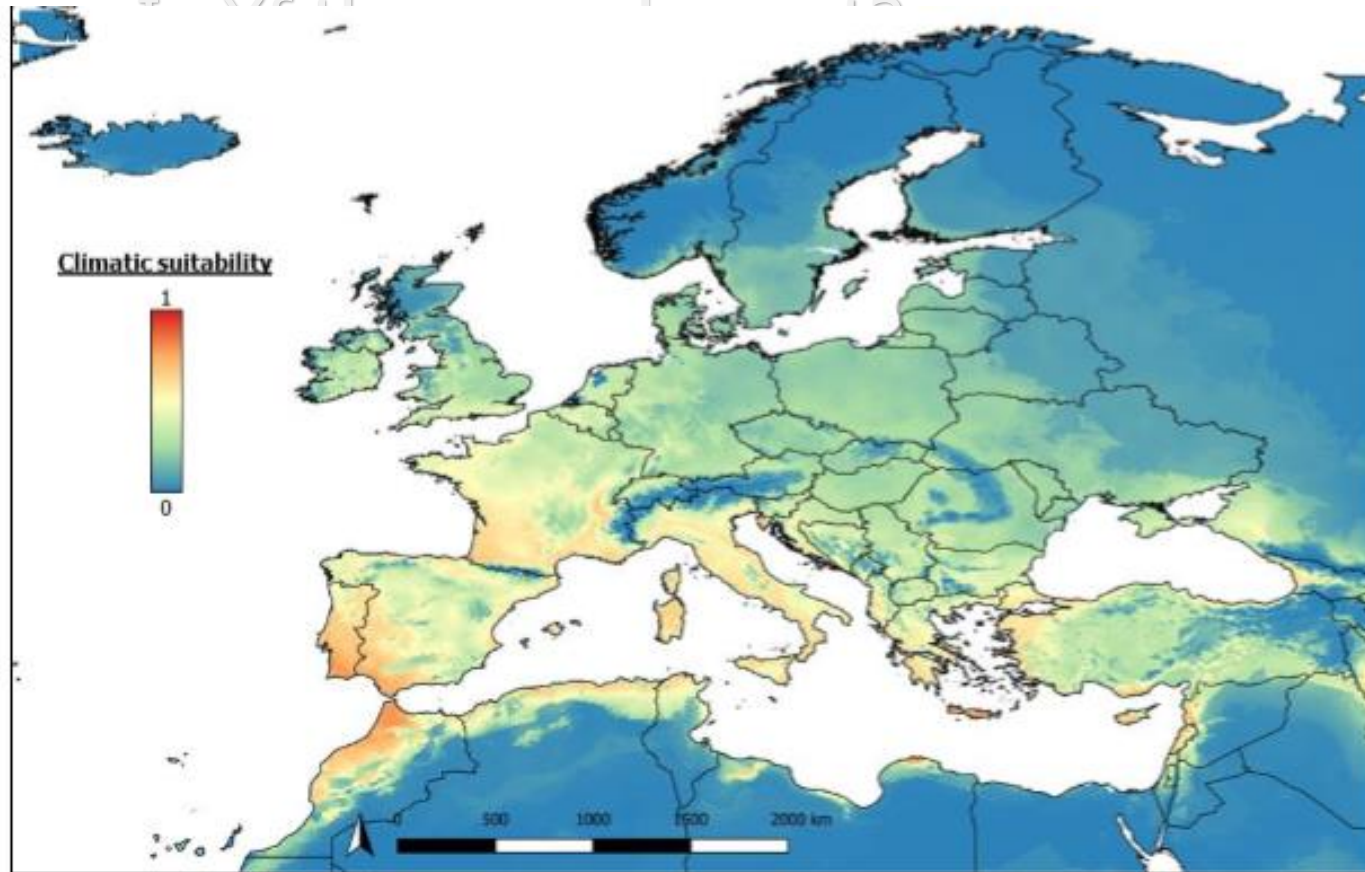


Figure 5. Estimated climatic suitability map for *Xylella fastidiosa* according to the MaxEnt model for the RCP 8.5 scenario for the time period 2041-2060.

- Potential distribution under current and future climate change scenarios
- selection of the most appropriate modelling method

Navas et al. DE 8.1 and 8.2

Impact of the results?

Contributions to the update of the PRA for Xf developed by EFSA

- Which areas are under threat?
- How to improve surveillance at EU level?
- Is Xf the causal agent?
- The local and EU vectors?
- How it spreads in olive groves?
- ?
- How to control the bacterium in the plant?
- How to manage the risk?
- How to prevent the spread and awareness?

SCIENTIFIC OPINION

ADOPTED: 28 April 2019

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Update of the Scientific Opinion on the risks to plant health posed by *Xylella fastidiosa* in the EU territory

■ How to control the bacterium in the plants

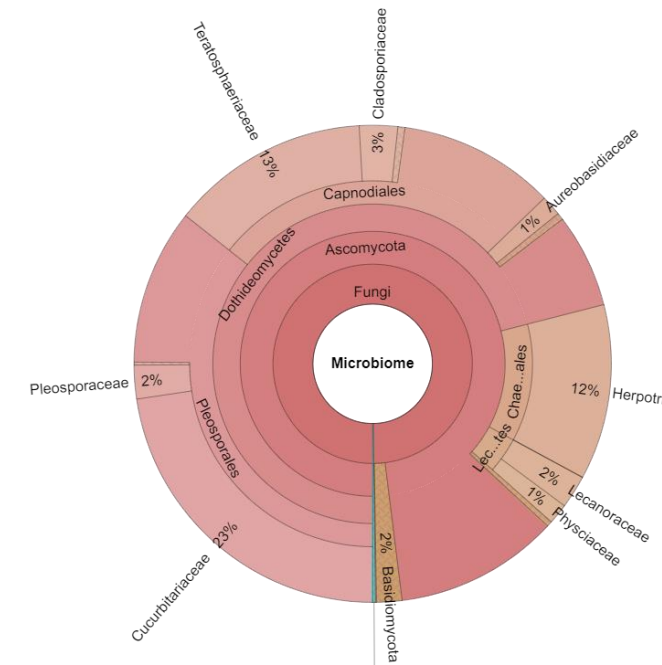
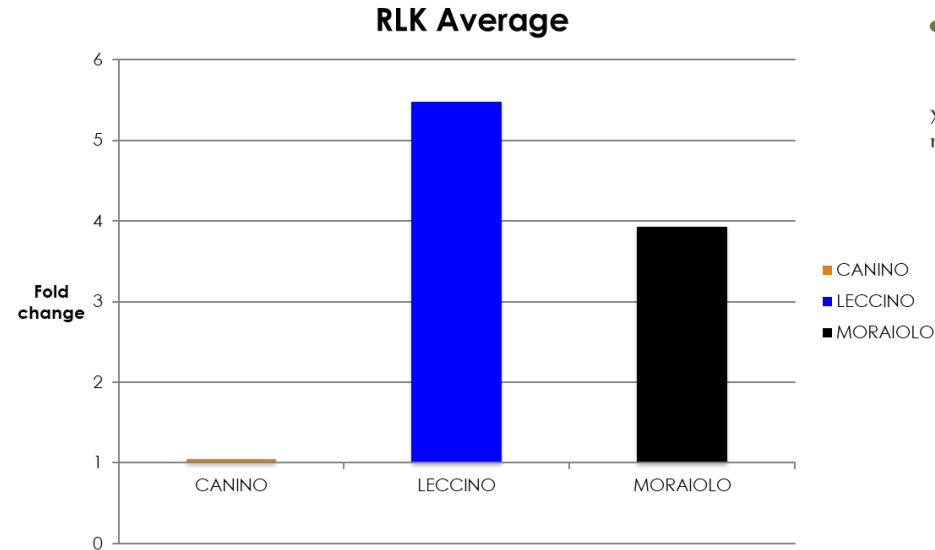


- Confirmation that phenotypic differences in olive cultivars are supported by different transcriptomic profiles – genes involved are consistent with previous studies in citrus and grapes (oral P. **Saldarelli**); search of resistant/tolerant olive cvs. (oral **Boscia**)
- Testing NAC applications (oral A. **de Souza**; poster C. **Dongiovanni**)
- First description of the microbiome in olive xylem tissues



NEXT STEP

- Further investigation on the mechanisms of resistance in olive and on the search of resistant olive germplasm
- Extensive investigations on the microbiome in resistant and susceptible olive cultivars (orals: 1) P. Baptista; 2) M. Morelli



■ How to control the vectors

- “Testing different insecticides”

Ground Vegetation in OLIVE Orchards:
Olea europaea L.

Arthropod Management Tests, XX(X), 2018, 1–2
doi: 10.1093/amt/tsy073
Section D: Citrus, Nuts, and Other Fruit Trees

OXFORD

Evaluation of Insecticides for the Control of Juveniles of
Philaenus spumarius L., 2015–2017

Crescenza **Dongiovanni**,^{1,7} Michele **Di Carolo**,² Giulio **Fumarola**,³ Daniele **Tauro**,⁴
Giuseppe **Altamura**,⁵ and Vincenzo **Cavaleri**⁶

- “Vegetation management”



Reduce the populations – cultivation of negatively selected species



EXPLOITATION OF THE RESULTS

■ NEXT STEP

- Use of vibrations to manipulate the behaviour of the meadow spittlebug (**Avosani**, oral presentation)
- Testing trapping for monitoring the populations (**Dongiovanni**, oral presentation)
- Testing other bio-insecticides



Xylella Fastidiosa Active Containment Through a
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■ How to enhance responsiveness and awareness





Thank you!