

SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator.

Action number: CA16107

STSM title: 'Plant diseases caused by *Xylella fastidiosa*: Detection, identification, monitoring and control'

STSM no. 42075

STSM start and end date: 11/11/2018 to 17/11/2018

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PURPOSE OF THE STSM

The purpose of the STSM was to participate in the International Course on *Xylella fastidiosa*, at the CIHEAM Mediterranean Institute for Advanced Agronomic Studies in Zaragoza, Spain, 12-16 November 2018. The course was jointly organized by the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM); through the Mediterranean Agronomic Institute of Zaragoza (IAMZ); the General Directorate for Health Agricultural Production of the Spanish Ministry of Agriculture and Fisheries, Food and the Environment (MAPAMA); and the following EU H2020 funded projects - XF-ACTORS (*Xylella Fastidiosa* Active Containment Through a multidisciplinary-Oriented Research Strategy), POnTE (Pests Organisms Threatening Europe) and MSCA-RISE CURE-XF (Capacity Building and Raising Awareness in Europe and in Third Countries to Cope with *Xylella fastidiosa*).

DESCRIPTION OF WORK CARRIED OUT DURING THE STSM

During the course, I followed the lectures according the program:

1. Introduction (1 hour) 1.1. The genus *Xylella* and the species *X. fastidiosa*: taxonomy and identification 1.2. Distribution 1.3. Host range and symptomatology 1.4. Vectors 2. Main ongoing research programmes in the EU (1 hour) 3. Biology and ecology of *X. fastidiosa* in the host plants (2 hours) 3.1. Host-bacteria interactions 3.1.1. Colonization 3.1.2. Plant defence 3.2. *X. fastidiosa* genome analyses 3.3. Virulence factors 4. Biology and ecology of insect vectors and *X. fastidiosa* transmission (6 hours) 4.1. Known vectors of *X. fastidiosa*: USA, Brazil, Europe 4.2. Vector identification 4.3. Life cycle of main vectors 4.4. Insect-bacteria interactions: transmission mechanisms 4.5. Practical work on vector sampling and identification 5. Current situation of *X. fastidiosa* worldwide: main diseases and socioeconomic impact (3 hours) 5.1. The Americas 5.1.1. PD – Pierce's disease of grapevine 5.1.2. CVC – citrus variegated chlorosis 5.1.3. ALS – almond leaf scorch 5.1.4. Other leaf scorchs of fruit and landscape trees 5.2. Europe 5.2.1. Italy: OQDS – olive quick decline syndrome 5.2.2. Corsica and PACA region, France 5.2.3. Balearic Islands and Alicante, Spain 5.3. Interceptions 6. Methods of inspection, sampling and monitoring of *X. fastidiosa* (5 hours) 6.1. Survey

methodology: statistical basis, planning and implementation 6.1.1. IPPC standards: ISPM6 and ISPM31; EU Guidelines; EPPO protocols for inspection 6.1.2. Practical example 6.2. Guidelines for sampling and sample preparation 6.3. Demonstrative field practicals for plant sampling 7. Methods for detection and identification of *X. fastidiosa* in plants and vectors (8 hours) 7.1. EPPO protocol for *X. fastidiosa* diagnosis 7.2. Subspecies and sequence-type identification 7.3. Molecular methods for on-site detection 7.4. Proximal and remote sensing 7.5. Practical work 7.5.1. Proximal sensing 7.5.2. On-site detection 7.5.3. Demonstration on MLST and NCBI database consultation 8. Epidemiology of *X. fastidiosa* (2 hours) 8.1. Modelling 8.2. Pest risk assessment 9. Strategies for *X. fastidiosa* control (3 hours) 9.1. Quarantine, prevention and eradication 9.2. Containment 9.2.1. Sources and search of resistance in host plants 9.2.2. Agronomical and chemical tools for controlling vector populations 9.2.3. Managing bacterial population in the plant 10. Legislation on *X. fastidiosa* in Europe (2 hours) 10.1. EU Decision 2015/789 and its amendments 10.2. Implementation in the affected countries 10.3. Example of a Contingency Plan: Spain 11. Practical group work based on case studies

DESCRIPTION OF THE MAIN RESULTS OBTAINED

After the course I have sound knowledge on the biology and ecology of the bacterium and its interactions with host plants and vectors. I've learned about vector life cycle and mechanisms of bacterial transmission and I have gained expertise on sampling and identification of insect vectors. I have learned theoretical I knowledge and developed skills on sampling and advanced diagnostic procedures, including molecular, on-site and remote sensing approaches for the early detection of the infections and subspecies assignation. I have improved my competence in plant health: principles of the current EU legislation on *X. fastidiosa*, official protocols and guidelines for monitoring and diagnosis of the bacterium. I also have acquired knowledge on the different aspects driving the epidemics and competence in performing pest risk assessment and developing management tools adapted to different scenarios.

FUTURE COLLABORATIONS (if applicable)

The gained knowledge on the *X. fastidiosa* will allow in fast and efficient detection of this pathogen in Poland in case of appearance. I also established new scientific relationships which can be fruitful in the future in the form of scientific collaboration.

