

1. Content of the 'Topic Description' document

1.1. Topic area

Pest/Vector biology, epidemiology, taxonomy

1.2. Links to the Euphresco Strategic Research Agenda

The topic addresses the following objective(s) of the 2017-2022 Euphresco Strategic Research Agenda

- Objective 2017-R-1.1: to improve knowledge on the biology, epidemiology and ecology of priority invasive and (re)emerging pests
- Objective 2017-R-1.2: to support taxonomic research for the unambiguous identification of pests
- Objective 2017-R-2.1: to improve knowledge on emerging pathways of entry and means of spread for pests

1.3. Topic title

The insect vectors of *Xylella fastidiosa*

1.4. Description of the problem the research should solve

Xylella fastidiosa is a bacterial pathogen responsible for several serious plant diseases across the world such as Pierce disease within grapevine in California and Citrus Variegated Chlorosis in Brazil. In 2013 *X. fastidiosa* was detected in Europe, associated with Olive Quick Decline Syndrome in olive trees in Apulia, Southern Italy. Since, the presence of the bacterium has also been confirmed in France, Spain, and Portugal (Denance *et al.*, 2012; Saponari *et al.*, 2013; Olmo *et al.*, 2017). Although the initial introduction of *X. fastidiosa* in Europe was through movement of infected plant material, the natural spread of the bacteria from plant to plant occurs via xylem feeding insects belonging to the Order Hemiptera (Redak *et al.*, 2004). In the Americas, the primary vectors are the glassy-winged and blue-green sharpshooters of the Cicadellinae sub-family however within Europe it is the common meadow spittlebug or froghopper *Philaenus spumarius* of the Aphrophoridae family that has been identified as the main vector (Cornara *et al.*, 2017). However, all sharpshooters and spittlebug species should be considered potential vectors of *Xylella* (Almolda *et al.*, 2005). Further research is required on the biology and population levels of other potential vectors and should include wherever possible transmission studies on the efficiency of any vector to transmit the bacterium to a range of relevant host plant species. For example, *Cicadella viridis* is the most common and wide-spread sharpshooter of the Cicadellinae sub-family in Europe requiring further study on its behaviour and nymphal stages.

The movement of vectors between crops and wild plants is essential to understand the epidemiology of *Xylella*. Seasonal movement and abundance of vectors is well-studied in vineyards and citrus groves in the Americas and more recently within olive groves (Park *et al.*, 2006; Ringenberg *et al.*, 2014; Bodino *et al.*, 2019), however additional research into other agroecosystems would be of benefit.

Routine surveillance for *X. fastidiosa* is carried out on symptomatic plants however it is also possible to detect the bacterium within the foregut of insects. Recent studies have indicated that, in conjunction with plant surveys, testing vectors for *X. fastidiosa* could be an important tool for monitoring the bacteria within the wider environment (Yaseen *et al.*, 2015; Craud *et al.*, 2018). Within vineyards, the collection and monitoring of sharpshooters is carried out using sticky traps, however collection of *Philaenus* is more labour intensive and in this context the development of traps or lures for known vectors should be investigated.

1.5. Description of the expected results

The project activities will cover:

- Investigation of the biology of vectors (and potential vectors) of *X. fastidiosa*, including feeding preferences and behaviour;
- Transmission studies to determine the efficiency of vectors to transmit *X. fastidiosa*;
- Studies on vector abundance and movement between crops and wild plants;
- Investigation of traps or lures for collection of *Philaenus spumarius* (as 'spy' insects);
- Assessment of potential biocontrol agents for vectors *i.e.* parasites, fungi;
- Investigation of the use of insect mesh and other alternatives to prevent *Xylella* vectors feeding

1.6. Beneficiaries of this research product

The project outcomes will benefit to:

- National Plant Protection Organizations;
- EPPO and its members (validated diagnostic protocols; information contributing to EPPO pest risk analyses);
- IPPC and its members;
- Farms, nurseries, industry and other stakeholders;
- National and EU policy makers;

1.7. Research funders and research contribution/ distribution

Funding organisation	Research activity and researchers involved
<p>1. Science and Advice for Scottish Agriculture, United Kingdom</p> <p>David Kenyon David.kenyon@sasa.gov.scot</p> <p>Fiona Highet Fiona.Highet@sasa.gov.scot</p>	<p>-Project coordination;</p> <p>-Investigate vector abundance and movement between crops and wild plants;</p> <p>-Compare trapping techniques for collection of vectors;</p> <p>-Studies on potential vectors (focus on species other than <i>Philaenus</i>);</p> <p>Contact person: Katherine Lester E. mail address: Katherine.lester@sasa.gov.scot</p>
<p>2. Department of Agriculture, Water and the Environment, Australia</p> <p>Con Goletsos acppo@agriculture.gov.au</p>	<p>-Identify potential vectors of <i>X. fastidiosa</i> in Australian plant industries at risk;</p> <p>-Understand the population dynamics of potential vectors;</p> <p>-Determine the critical times of the year when potential vector populations peak;</p> <p>-Understand plant host range of potential vector species;</p> <p>-Understand biology and feeding behaviour of potential vectors on selected plants at risk;</p> <p>Contact person: Craig Elliott Email address: Craig.Elliott@wineaustralia.com</p> <p>Contact person: Piotr Trebicki</p>



	<p>Email address: Piotr.trebicki@agriculture.vic.gov.au</p>
<p>3. Federal Ministry for Sustainability and Tourism, Austria</p> <p>Sylvia Bluemel sylvia.blueme@ages.at</p>	<p>-Investigate vector abundance and movement between crops and wild plants; -Compare trapping techniques for collection of vectors;</p> <p>Contact person: Gudrun Strauss E. mail address: gudrun.strauss@ages.at</p>
<p>4. Flanders Research Institute for Agriculture, Fisheries and food, Belgium</p> <p>Kris De Jonghe kris.dejonghe@ilvo.vlaanderen.be</p>	<p>- Compare trapping techniques for collection of vectors; -Literature study on potential <i>X. fastidiosa</i> vectors in Belgium; -Persistence studies of <i>Xylella</i> in nymphs (after moult) and adults (in time) of <i>Philaenus spumarius</i> and <i>Aphrophora salicina</i>; -Transmission studies;</p> <p>Contact person: Jochem Bonte E. mail address: Jochem.bonte@ilvo.vlaanderen.be</p>
<p>5. Ministry of Agriculture, Plant Biosecurity, Plant Protection and Inspection Services, Israel</p> <p>Yael Meller Harel yaelm@moag.gov.il</p>	<p>-Contribution to be detailed;</p> <p>Contact person: E. mail address: liatq@moag.gov.il</p>
<p>6. Netherlands Food and Consumer Products Safety Authority, Netherlands</p> <p>Martijn Schenk M.Schenk1@nvwa.nl</p>	<p>-Contribution to be detailed;</p>
<p>7. Plant and Food Research, New Zealand</p> <p>Aur�lie Castinel Aurelie.Castinel@mpi.govt.nz</p>	<p>-Attending and/or contributing to workshops and discussions;</p> <p>Contact person: Jessica.Dohmen E. mail address: Vereijssen@plantandfood.co.nz</p>
<p>8. National Institute for Agricultural and Veterinarian Research, Portugal</p> <p>Leonor Cruz leonor.cruz@iniav.pt</p>	<p>-Assessment of potential biocontrol agents for vectors <i>i.e.</i> parasites, fungi (a new formulation); -Investigate vector abundance and movement between crops (vines) and wild plants;</p> <p>Contact person: Paula S� Pereira E. mail address: paula.sapereira@iniav.pt</p>
<p>9. Ministry of Agriculture Forestry and Food, Slovenia</p> <p>Erika Oresek Erika.oresek@gov.si</p>	<p>-Contribution to be detailed;</p> <p>Contact person: Tanja Dreo E. mail address: tanja.dreo@nib.si</p>



<p>10. Department for Environment Food and Rural Affairs, United Kingdom</p> <p>Iain Dummett Iain.Dummett@defra.gov.uk</p>	<p>-Produce a literature review on the natural enemies of the 18 species of Aphrophoridae and xylem-feeding Cicadellidae in the UK; -Investigate feeding preferences of <i>P. spumarius</i> (and potential vectors) of <i>X. fastidiosa</i>; -Investigate vector abundance and movement between crops and wild plants; -Trapping techniques for collection of vectors for <i>Xylella</i> testing; -Investigate feeding preferences as a potential method to understand movement of spittlebugs between habitats;</p> <p>Contact person: Ed Haynes E. mail address: Edward.Haynes@fera.co.uk</p> <p>Contact person: Rachel Down E. mail address: Rachel.Down@fera.co.uk</p>
<p>11. Agricultural University of Tirana, Albania</p> <p>Ejup Çota ecota@ubt.edu.al</p>	<p>-Contribution to be detailed;</p> <p>Contact person: Ejup Çota E. mail address: ecota@ubt.edu.al</p>
<p>12. Université catholique de Louvain, Belgium</p> <p>Claude Bragard claude.bragard@uclouvain.be</p>	<p>-Distribution, phenology and natural history of potential vectors of <i>Xylella fastidiosa</i> in Belgium; -Dispersal by flight in the field and in laboratory conditions; -Host specificity, host changes and individual host trajectories of potential vector species; -Pathogen transmission capacity of potential vector species;</p> <p>Contact person: Noemi Casarin E. mail address: noemi.casarin@uclouvain.be</p>
<p>13. Université libre de Bruxelles, Belgium</p> <p>Jean-Claude Grégoire jcgregoi@ulb.ac.be</p>	<p>-Distribution, phenology and natural history of potential vectors of <i>Xylella fastidiosa</i> in Belgium; -Dispersal by flight in the field and in laboratory conditions; -Host specificity, host changes and individual host trajectories of potential vector species; -Pathogen transmission capacity of potential vector species;</p> <p>Contact person: Séverine Hasbroucq E. mail address: Severine.Hasbroucq@ulb.ac.be</p>
<p>14. National Agricultural Research Institute of Tunisia</p> <p>Bouhachem Sonia</p>	<p>-Contribution to taxonomy of <i>Philaenus</i> species in the Mediterranean area; -Identification of plant host and distribution of <i>Philaenus</i> and <i>Neophilaenus</i> species;</p>



<p>bouhachems@gmail.com</p>	<ul style="list-style-type: none"> -Temporal and seasonal trapping of Auchenorrhyncha to study the species diversity in Tunisia and to know other possible vectors; -Comparison of two kinds of trapping Sweep net and Yellow sticky traps; -Feeding behaviour of <i>Philaenus</i> and <i>Neophilaenus</i> species and other possible xylem feeder by EPG. <p>Contact person: Bouhachem Sonia E. mail address: bouhachems@gmail.com</p>
<p>15. Regional Research Centre on Horticulture and Organic Agriculture, Tunisia</p> <p>Asma Laarif laarif_a@yahoo.fr laarif.asma@iresa.agrinet.tn</p>	<ul style="list-style-type: none"> -Trapping techniques for collection of vectors for <i>Xylella</i> testing; -Morphological and molecular Identification of potential vectors of <i>Xylella fastidiosa</i>; -Distribution, phenology of potential vectors of <i>Xylella fastidiosa</i> in the centre and the south of Tunisia; <p>Contact person: Asma Laarif E. mail address: laarif_a@yahoo.fr</p>

1.8. Research project partnership outside Euphresco

Euphresco funding ensures a certain level of transnational collaboration among Euphresco member countries. It is possible, if the funding consortium is interested, to contact funding organisations or research groups outside the geographical area covered by Euphresco members. The Euphresco coordinator could advertise the research topic in order to have an enlarged collaboration. If funders are interested in this possibility, please check the case below:

The funding consortium of the topic mentioned in section 1.2 requires that the topic is advertised outside the Euphresco network

Information to define the profile of sought partners could be useful (but not mandatory): country/region (if there are preferences), skills/expertise required, etc.

1.9. Any other relevant information on content

None.

2. Euphresco management aspects of the project

2.1. Indication of the topic budget

Funding organisation ^a	Mechanism ^b	Total Budget ^c
1. SASA (GB)		€
2. DAWE (AU)		€
3. AGES (AT)		€
4. ILVO (BE)		€
5. MOAG (IL)		€
6. NVWA (NL)		€
7. MPI (NZ)		€
8. INIAV (PT)		€
9. MKGP (SI)		€
10. Defra (GB)		€
11. AUT (AL)		€
12. UCL (BE)		€
13. ULB (BE)		€
14. INRAT (TN)		€
15. IRESA (TN)		€
total		€

2.2. Expected duration of the project (only for non-competitive topics)

24 months

2.3. Identification of project coordinator

Has the research project coordinator been identified?

- Yes
 No

2.4. Any other relevant information on topic organisation and management

^a First member is project coordinator. A minimum of two partners are necessary for each proposal. Add lines as needed.

^b Please indicate the preferred mechanism (e.g. real pot RP; virtual pot VP; non-competitive NC), or several mechanisms if there is flexibility.

^c Optional, as this amount can still change in the next phase. In-kind contribution should also be indicated in this column.