

**Thèmes de recherche (projets RI) : santé des végétaux - Euphresco**

<b>Topic code</b>	<b>Topic title</b>
2019-F-310	<i>PhyLib III</i>
2019-C-315	Efficacy of anaerobic digestion as a means of destruction for infected plant material
2019-E-328	Next generation sequencing in bacterial diagnostics: WGS & meta-barcoding
2019-A-330	Detecting virus-carrying <i>Xiphinema</i> spp. as an alternative to <i>Xiphinema</i> identification up to species level in trade
2019-A-331	Remote sensing in plant health: expanding the scene (PLANTRESENS)

***Short description***

The number of psyllid species known to harbor *Liberibacter solanaceum* (Lso) is increasing. It is necessary to understand the ability of these psyllids to vector Lso and the potential risks they pose to crop plants. This will require the establishment of Lso +ve and –ve psyllid colonies for lab-based transmission studies, plant choice experiments, host plant interaction studies and psyllid behaviour studies. This will be complemented by genome analysis of a range of newly identified Lso haplotypes via genome sequencing, MLST and gene expression approaches. This will enable comparison of: different haplotypes, geographical differences between the same haplotypes; genes responsible for pathogenicity and microbe-plant/ microbe-psyllid interactions. Psyllid diversity across Europe will be monitored via field surveys and suction trap sampling, along with the prevalence and distribution of Lso and Phytoplasmas and potential weed/over wintering reservoirs of these microbes.

The project should include :

- characterization of new Lso haplotypes/ *Liberibacter* spp. from new psyllid hosts
- genome seq / MLST of haplotype U (from multiple locations)
- screening psyllid specimens for Lso (field and suction trap)
- screening psyllid specimens for Phytoplasmas
- screening alternative insect groups for Lso and Phytoplasmas (aphids, hoppers, other hemiptera)
- set-up colonies of *T. urt*, *T. anthrisci* and *N. subpunctata*
- transmission studies on *T. urticae* and *T. anthrisci*, *N. subpunctata* (host plant, transmission to carrot and potato)
- plant choice studies on *T. urticae* and *T. anthrisci*, *N. subpunctata*
- overwintering hosts
- EPG on *T. anthrisci*

***Description of the end product***

An enhanced understanding of Lso populations and their vectors and the risk they pose to crop health.

***Provisional other funders (to be completed in a later stage)***

Science and Advice for Scottish Agriculture (SASA), UK (contact: Dr. David Kenyon, david.kenyon@sasa.gsi.gov.uk)

***Provisional project duration***

> 2 years

<b>2019-C-315 Efficacy of anaerobic digestion as a means of destruction for infected plant material</b>
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***Short description***

Investigate the efficacy of anaerobic digestion as a means of destruction for infected plant material, rather than landfill or incineration, such as required following a diagnosis of *Xylella*, *Xanthomonas*, and other quarantine pathogens and pests.

Determine culture viability following processing, for example through molecular analysis.

***Description of the end product***

Methodology to test output for pathogen viability; protocol as means of processing of infected planting material.

***Provisional other funders (to be completed in a later stage)***

- Department for Environment, Food and Rural Affairs, UK (Contact: Ms Laura Pinney, Laura.Pinney@defra.gsi.gov.uk)

***Provisional project duration***

1 - 2 years

## **2019-E-328 Next generation sequencing in bacterial diagnostics: WGS & meta-barcoding**

### ***Short description***

Next generation sequencing (NGS) in its various forms has provided significant benefits to the viral diagnostics. In bacteriology, it is used to a limited extent. The aim of the project would be to facilitate exchange of knowledge and experience with NGS in bacteriology and to identify critical points and potential benefits. The exchange would take place in the form of symposia, exchange of protocols and/or laboratory visits. Two broad areas will be examined, whole genome sequencing (WGS) and meta-barcoding.

WGS and tools of comparative genomics allow characterization of completely unknown pathogens, resolving taxonomy issues, informed selection of novel targets for detection tests, more efficient outbreak analysis, identification of novel relevant characteristics (effectors, virulence factors, antibiotic resistance). Meta-barcoding is a rapid method of biodiversity assessment that combines two technologies: DNA-based identification and high-throughput DNA sequencing. It is particularly useful when it is preferable to use a combination of a more generic detection method with more or less targeted approach.

Capacity of laboratories to perform WGS and/or meta-barcoding analysis will be mapped from both infrastructure and knowledge requirements and the critical challenges for its adoption will be identified. This would allow for a coordinated further activity of the reference laboratories in the transfer of WGS and comparative genomics into routine use.

### ***Description of the end product***

Identification of NGS potential and plans for further collaboration (white paper or publication)

### ***Provisional other funders (to be completed in a later stage)***

- Ministry of Agriculture Forestry and Food, Slovenia (Contact: Ms Erika Oresek, erika.oresek@gov.si)

### ***Provisional project duration***

> 2 years

<b>2019-A-330 Detecting virus-carrying <i>Xiphinema</i> spp. as an alternative to <i>Xiphinema</i> identification up to species level in trade</b>
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***Short description***

Nematodes of the genus *Xiphinema* (dagger nematodes) are migratory root ectoparasites with a broad host range. There are more than 260 species, of which approximately 50 belong to the *Xiphinema americanum* group (*X. americanum sensu lato*). This group has a quarantine status as some of the species can transmit certain nepoviruses. The identification up to species level is quite difficult based on morphological and morphometric data, and most of the time impossible due to lack of specimen or appropriate stadia. There is not enough molecular information available of all species to develop reliable tools such as PCR or barcoding. However, the main issue is that some specimen are potential carriers of viruses. Therefore, it has been suggested that only those species that have been shown to carry viruses are considered quarantine organisms, although their identification is very difficult. Focusing on a direct detection of these viruses in the nematodes could be an alternative to correctly identifying these *Xiphinema* species that are able to transmit viruses. This way, only specimen of the *X. americanum* group that are carrying viruses can be considered as a Plant Health risk, and consignments carrying *Xiphinema* spp. free of viruses could enter trade. In this project, reliable techniques to detect viruses in *Xiphinema* nematodes will be developed and validated, with an emphasis on sensitivity and specificity. The tool could later be applied to other nematode genera transmitting viruses.

***Description of the end product***

A validated technique for detection of viruses in *Xiphinema* nematodes that are of quarantine concern.

***Provisional other funders (to be completed in a later stage)***

- Institute for Agricultural and Fisheries Research, Belgium (Contact: Mr Kris De Jonghe, kris.dejonghe@ilvo.vlaanderen.be)

***Provisional project duration***

1 - 2 years

## **2019-A-331 Remote sensing in plant health: expanding the scene (PLANTRESENS)**

### ***Short description***

In recent years, great progress has been made in the use of remote sensing in various domains, including plant health. The state-of-the art has been presented during the scientific colloquium “perspectives on the use of remote sensing in plant health” co-organised by EPPO and Euphresco in September 2018.

Building on today’s knowledge, the scientific community as well as policy makers acknowledged that further research and enlarged transnational collaboration is needed to bridge the gap between research and application of remote sensing in practice.

The Euphresco project PHeRS, presented at the Colloquium, has shown that remote sensing has a large potential as a tool for official monitoring of regulated harmful organisms. In the PHeRS report, recommendations for further research were identified in view of overcoming current limitations for plant health application. For example, research is needed to identify wavelength packages for detecting specific biotic and abiotic stresses, to develop near-ground or other sensors targeting harmful organisms of phytosanitary concern, and to advance algorithms and software in a way that Remote Sensing can easily be used by inspectors in the field.

It is encouraged to expand the applicability of the technique towards different fields in plant health (forestry, field crops, fruit, potatoes, ...) and to target a wide range of harmful organisms.

### ***Description of the end product***

Advances in remote sensing for official monitoring, practical applications

***Provisional other funders (to be completed in a later stage)***  
*not identified yet*

### ***Provisional project duration***

3 years