

## 1. Content of the 'Topic Description' document

### 1.1. Topic area

Diagnostics, field detection, surveillance

### 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-6.1: to test and validate methods for in situ detection and identification of pests
- Objective 2017-I-2.2: to contribute to databases for plant pests identification and diagnostics

### 1.3. Topic title

Fast detection methods for quarantine Tephritidae (TEPHRIFADE)

### 1.4. Description of the problem the research should solve

In the commission implementing regulation (EU) 2019/2072, non-European Tephritidae are categorised as quarantine pests (annex II A), and specific examples are listed. Furthermore, *Anastrepha ludens*, *Bactrocera dorsalis*, *Bactrocera zonata* and *Rhagoletis pomonella* have been included in the list of priority pests (Delegated Regulation (EU) 2019/1702) because their introduction can lead to the worst economic, ecological or social consequences for the entire territory of the European Union. Other examples of important Tephritidae species are *Bactrocera latifrons* and *Zeugodacus cucurbitae*. Identification of intercepted and detected Tephritidae to genus or species level is important for adequate follow-up, risk assessment and evaluation of measures; this issue has been raised repeatedly.

The list of non-European Tephritidae was analysed in more detail by EFSA<sup>1</sup>. The EFSA pest categorization of this group is taken on board in the ongoing discussions on the revision and possible amendment of the EU quarantine pest list, preferring a classification at species (or genus) level as far as possible. If a modification to genus/species listing enters into force, it is even more important to have diagnostic methods adapted to that level for all life stages. This holds in particular for larval stages, that are the most difficult to identify and the most intercepted in imported fruits. Morphological identification methods exist for adult and later larval stages, whereas identification of the most intercepted earlier stages currently requires upfront rearing or sequencing. Alternative methods that are faster and potentially applicable on-site are under development on a national level and in European projects (e.g. 'In-silico boosted, pest prevention and off-season focused IPM against new and emerging fruit flies' FF-IPM). Moreover, fast detection methods are preferred as the majority of interceptions relate to perishable goods.

The project specific tasks could, amongst others, comprise:

1. Compilation of an international inventory of fast diagnostic methods (such as LAMP tests, real-time PCR) for Tephritidae genera and species that are currently available or being developed.
2. Transnational exchange of protocols and best practices, and organisation of interlaboratory tests among the project partners for specific fast detection methods, to validate and

<sup>1</sup> <https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2020.5931>

implement the best methods in different laboratories, and harmonize diagnostic protocols and guidelines

3. Compilation of an overview of available sequences necessary for (more classical) diagnostics for Tephritidae genera and species and identification of gaps
4. Collecting type species and performing sequencing experiments in order to fill the identified gaps
5. Mapping current monitoring and testing methods and distributions, and reflecting on methodological harmonisation, taking into account previous national and transnational projects (see also 1.9)
6. Mapping and testing of surveillance methods based on DNA metabarcoding to survey insect communities collected in traps
7. Organisation of training activities related to morphological identification along with molecular techniques for fast detection of quarantine Tephritidae
8. Transfer newly generated and quality-controlled sequence data to the curators of EPPO Q-bank

### 1.5. Description of the expected results

The project main results are:

- An inventory, enhanced knowledge and know-how of fast methods for the detection of Tephritidae at genus and species level
- An expanded panel of available sequences for Tephritidae species

### 1.6. Beneficiaries of this research product

The project activities and results will benefit to:

- National Plant Protection Services
- Inspection services
- National and EU policy makers
- EPPO and its members
- EFSA
- Fruit production and viticulture sector
- Plant scientific research community

### 1.7. Research funders and research contribution/ distribution

Funding organisation	Research activity and researchers involved
1. Federal Public Service of Health, Food Chain Safety and Environment, Belgium  Ria Nouwen <a href="mailto:ria.nouwen@health.fgov.be">ria.nouwen@health.fgov.be</a>	Potential research activities: to be confirmed after national VP-selection & peer review. -project coordination; -contribution to tasks (1) to (4) mentioned in 1.4; -experiences and samples exist from national as well as international projects and Tephritid Barcoding Initiative;  Researchers involved: to be confirmed after national VP-selection
2. Department of Agriculture, Water and the Environment, Australia  Con Goletsos	-Contribution to be detailed;  Contact person: E-mail address:



<p><a href="mailto:ACPPO@agriculture.gov.au">ACPPO@agriculture.gov.au</a></p> <p>3. Austrian Agency for Health and Food Safety, Austria</p> <p>Sylvia Bluemel <a href="mailto:sylvia.bluemel@ages.at">sylvia.bluemel@ages.at</a></p>	<p>-Contribution to tasks (1) to (5), (7) and (8);</p> <p>Contact person: Richard Gottsberger E-mail address: <a href="mailto:richard.gottsberger@ages.at">richard.gottsberger@ages.at</a></p> <p>Contact person: Helga Reizenzein E-mail address: <a href="mailto:helga.reizenzein@ages.at">helga.reizenzein@ages.at</a></p> <p>Contact person: Alois Egartner E-mail address: <a href="mailto:alois.egartner@ages.at">alois.egartner@ages.at</a></p> <p>Contact person: Christa Lethmayer E-mail address: <a href="mailto:christa.letmayer@ages.at">christa.letmayer@ages.at</a></p>
<p>4. Ministry of Foreign Trade and Economic Relations Administration of B&amp;H for Plant Health Protection, Bosnia and Herzegovina</p> <p>Ajla Dautbasic <a href="mailto:ajla.dautbasic@uzzb.gov.ba">ajla.dautbasic@uzzb.gov.ba</a></p> <p>Marko Ivankovic <a href="mailto:Marko.Ivankovic@faz.gov.ba">Marko.Ivankovic@faz.gov.ba</a></p>	<p>-Contribution to tasks (1) to (4) and (7);</p> <p>Contact person: Ana Crnogorac E-mail address: <a href="mailto:Ana.Crnogorac@faz.gov.ba">Ana.Crnogorac@faz.gov.ba</a></p> <p>Contact person: Jure Proleta E-mail address: <a href="mailto:Jure.Proleta@faz.gov.ba">Jure.Proleta@faz.gov.ba</a></p> <p>Contact person: Ana Marija Vljic E-mail address: <a href="mailto:AnaMarija.Vljic@faz.gov.ba">AnaMarija.Vljic@faz.gov.ba</a></p>
<p>5. Canadian Food Inspection Agency, Canada</p> <p>Brittany Day <a href="mailto:brittany.day@canada.ca">brittany.day@canada.ca</a></p> <p>Sarah G. Davis <a href="mailto:sarah.davis@inspection.gc.ca">sarah.davis@inspection.gc.ca</a></p>	<p>-Contributions to tasks (1) and (4);</p> <p>Contact person: Erin Campbell E-mail address: <a href="mailto:erin.campbell@inspection.gc.ca">erin.campbell@inspection.gc.ca</a></p> <p>Contact person: Graham Thurston E-mail address: <a href="mailto:graham.thurston@canada.ca">graham.thurston@canada.ca</a></p>
<p>6. Federal Ministry of Food and Agriculture, Germany</p> <p>Bettina Beerbaum <a href="mailto:bettina.beerbaum@bmel.bund.de">bettina.beerbaum@bmel.bund.de</a></p> <p>Silke Steinmüller <a href="mailto:silke.steinmoeller@julius-kuehn.de">silke.steinmoeller@julius-kuehn.de</a></p>	<p>-Monitoring of important fruit fly species in orchards in Brandenburg and Berlin regions and their establishment potential;</p> <p>-Test different monitoring traps in orchards in the Federal Lands Brandenburg and Berlin for the following fruit fly species: <i>Ceratitis capitata</i>, <i>Ceratitis rosa</i>, <i>Rhagoletis pomonella</i>, <i>Bactrocera dorsalis</i>;</p> <p>-Analyse the climatic condition for Germany to check the potential for establishment;</p> <p>Contact person: Peter Baufeld E-mail address: <a href="mailto:Peter.Baufeld@julius-kuehn.de">Peter.Baufeld@julius-kuehn.de</a></p>



<p>7. Ministry of Agriculture, Plant Biosecurity, Plant Protection and Inspection Services, Israel</p> <p>Abed Gera <a href="mailto:AbedG@moag.gov.il">AbedG@moag.gov.il</a></p> <p>Yael Meller Harel <a href="mailto:YaelM@moag.gov.il">YaelM@moag.gov.il</a></p>	<ul style="list-style-type: none"> <li>-Contribution to tasks (1), (2) and (5);</li> <li>-Compilation of an international inventory of fast diagnostic methods (LAMP tests);</li> <li>-Transnational exchange of protocols and best practices, and support in organisation of interlaboratory tests;</li> <li>-Participation in training participants on morphological identification of quarantine fruit flies along with molecular techniques for fast detection;</li> <li>-Sharing of sequences of local population of <i>Bactrocera zonata</i> and <i>Dacus ciliatus</i>, and share standard operating procedures for real- time PCR for <i>Bactrocera zonata</i>;</li> </ul> <p>Contact person: Liat Gidron E-mail address: <a href="mailto:liatg@moag.gov.il">liatg@moag.gov.il</a></p> <p>Contact person: Tomer Gershon E-mail address: <a href="mailto:Tomerg@moag.gov.il">Tomerg@moag.gov.il</a></p>
<p>8. Netherlands Food and Consumer Products Safety Authority, the Netherlands</p> <p>Martijn Schenk <a href="mailto:M.Schenk1@nvwa.nl">M.Schenk1@nvwa.nl</a></p>	<ul style="list-style-type: none"> <li>-Contributions to task (1) to (4) and (7);</li> <li>-Use of the accredited ILLUMINA pipeline to sequence (reference) specimens;</li> </ul> <p>Contact person: Bart van de Vossenber E-mail address: <a href="mailto:b.t.l.h.vandevossenber@nvwa.nl">b.t.l.h.vandevossenber@nvwa.nl</a></p> <p>Contact person: Jan Mertens E-mail address: <a href="mailto:j.e.j.mertens@nvwa.nl">j.e.j.mertens@nvwa.nl</a></p>
<p>9. Ministry for Primary Industries, New Zealand</p> <p>Aur�lie Castinel <a href="mailto:Aurilie.Castinel@mpi.govt.nz">Aurilie.Castinel@mpi.govt.nz</a></p>	<ul style="list-style-type: none"> <li>-real-time PCR based diagnostic test for <i>Zeugodacus cucurbitae</i> (Coquillett);</li> </ul> <p>Contact person: Rebijith Balan E-mail address: <a href="mailto:Rebijith.Balan@mpi.govt.nz">Rebijith.Balan@mpi.govt.nz</a></p>
<p>10. Ministry of Agriculture Forestry and Food, Slovenia</p> <p>Erika Oresek <a href="mailto:erika.oresek@gov.si">erika.oresek@gov.si</a></p>	<ul style="list-style-type: none"> <li>-Contribution to tasks (1), (2) and (7);</li> <li>-Compilation of an international inventory of fast diagnostic methods (LAMP tests);</li> <li>-Transnational exchange of protocols and best practices, and support in organisation of interlaboratory tests;</li> <li>-Participation in training participants on morphological identification of quarantine fruit flies along with molecular techniques for fast detection;</li> </ul>



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<p>11. Ministry of Agriculture, Tunisia</p> <p>Mohamed Lahbib Ben Jamâa <a href="mailto:benjamaaml@gmail.com">benjamaaml@gmail.com</a></p>	<p>-Contribution to tasks 1, 2 and 7; -Detection and surveillance of quarantine fruit flies in Tunisia (in orchards and entry points): <i>Bactrocera zonata</i>, <i>B. dorsalis</i>, <i>B. latifrons</i>, <i>Zeugodacus cucurbitae</i>, with different traps and lures; -Identification of tephritids at larval and adult stages based on fast methods developed in the project;</p> <p>Contact person: Synda Boulahia Kheder E-mail address: <a href="mailto:synda.kb@gmail.com">synda.kb@gmail.com</a></p> <p>Contact person: Sonia Boukhris Bouhachem E-mail address: <a href="mailto:bouhachems@gmail.com">bouhachems@gmail.com</a></p> <p>Contact person: Adel Jemmazi E-mail address: <a href="mailto:adel.jemmazi@gmail.com">adel.jemmazi@gmail.com</a></p>
<p>12. Department for Environment, Food and Rural Affairs, United Kingdom</p> <p>Iain Dummett <a href="mailto:Iain.Dummett@defra.gov.uk">Iain.Dummett@defra.gov.uk</a></p>	<p>-Contribution to be detailed;</p> <p>Contact person: E-mail address:</p>
<p>13. US Department of Agriculture, Animal and Plant Health Inspection Service, United States of America</p> <p>Jennifer Nicholson <a href="mailto:jennifer.s.nicholson@usda.gov">jennifer.s.nicholson@usda.gov</a></p>	<p>-Contribution to tasks (1) to (3)</p> <p>Contact person: Norman Barr E-mail address: <a href="mailto:norman.b.barr@usda.gov">norman.b.barr@usda.gov</a></p>
<p>14. Danish Veterinary and Food administration, Denmark</p> <p>Regin Mandrup Rønn <a href="mailto:REMRO@fvst.dk">REMRO@fvst.dk</a></p>	<p>-Contribution to tasks (1) to (4);</p> <p>Contact person: Regin Mandrup Rønn E-mail address: <a href="mailto:REMRO@fvst.dk">REMRO@fvst.dk</a></p>
<p>15. Volcani Institute, Israel</p> <p>Murad Ghanim <a href="mailto:ghanim@volcani.agri.gov.il">ghanim@volcani.agri.gov.il</a></p>	<p>-Contribution to tasks (1) to (4); -Compilation and sequencing species in Israel; -Sharing protocols for DNA extraction and sequencing from whole insects and parts of insects (legs, internal organs, larvae of different stages);</p>



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16. National Research Council, Italy  Umberto Bernardo <a href="mailto:umberto.bernardo@ipspp.cnr.it">umberto.bernardo@ipspp.cnr.it</a>	-Contribution to be detailed;  Contact person: Umberto Bernardo E-mail address: <a href="mailto:umberto.bernardo@ipspp.cnr.it">umberto.bernardo@ipspp.cnr.it</a>  Contact person: Francesco Nugnes E-mail address: <a href="mailto:francesco.nugnes@ipspp.cnr.it">francesco.nugnes@ipspp.cnr.it</a>
17. University of the Azores, Portugal  David João Horta Lopes <a href="mailto:david.jh.lopes@uac.pt">david.jh.lopes@uac.pt</a>	-Monitoring and essays of different traps and lures and attractants against Azorean important crop pests; -Surveillance of not introduced in Azores islands such as <i>Batrocera dorsalis</i> and other;  Contact person: Elisa Tarantino E-mail address: <a href="mailto:elisa.tarantino12@gmail.com">elisa.tarantino12@gmail.com</a>
18. Research - Development Institute for Plant Protection, Romania  Constantina Chireceanu <a href="mailto:cchireceanu@yahoo.com">cchireceanu@yahoo.com</a>	-Supply of insects collected with the Tephri-traps in the field for other colleagues to perform sequencing experiments; -Attend training (task 7) to gain knowledge and experience;  Contact person: Constantina Chireceanu E-mail address: <a href="mailto:cchireceanu@yahoo.com">cchireceanu@yahoo.com</a>
19. Caribbean Agricultural Health and Food Safety Agency, Suriname  Juliet Goldsmith <a href="mailto:juliet.goldsmith@cahfsa.org">juliet.goldsmith@cahfsa.org</a>	-Contribution to be detailed;  Contact person: E-mail address:

### 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**

National activities on this topic have been undertaken in Belgium, Austria, New Zealand. Past Euphresco activities are project 2015-E-156 “Development and implementation of early detection tools and effective management strategies for invasive non-European and other selected fruit fly species of economic importance (FLY DETECT)”: <https://zenodo.org/record/3732297#.YA7CAOhKiUI> and 2017-F-236 “Ceratitis capitata: Better knowledge for better risk management (FruitflyRISKmanage)” <https://zenodo.org/record/5036317#.YNmq0-gzaUI>

## 2. Euphresco management aspects of the project

### 2.1 Indication of the topic budget

Funding organisation <sup>a</sup>	Mechanism <sup>b</sup>	Total Budget <sup>c</sup>
1. FPS (BE)	NC/VP	€
2. DAWE (AU)	NC	€
3. AGES (AT)	NC	€
4. UZBB (BA)	NC	€
5. CFIA (CA)	NC	€
6. BMEL (DE)	NC	€
7. MOAG (IL)	NC	€
8. NVWA (NL)	NC	€
9. MPI (NZ)	NC	€
10. MAFF (SI)	NC	€
11. MoA (TN)	NC	€
12. DEFRA (GB)	NC	€
13. APHIS (US)	NC	€
14. FVST (DK)	NC	€
15. VOLCANI (IL)	NC	€
16. CNR (IT)	NC	€
17. UoA (PT)	VP	€
18. ICDPP (RO)	NC	€
19. CAHFSA (SR)	NC	€

### 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, national call launched and proposal under evaluation

### 2.4 Any other relevant information on topic organisation and management

None.

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

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

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